

STREAMLINE YOUR MIND

BY

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LONDON:

WATTS & CO.,

5 & 6 JOHNSON'S COURT, FLEET STREET, E.C.4

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First English Edition 1937
Reprinted 1943
Reprinted 1944
Reprinted 1945
Reprinted 1946

Other Works by
JAMES L. MURSELL

PRINCIPLES OF EDUCATION
HUMAN VALUES IN MUSIC
EDUCATION

PSYCHOLOGY OF SCHOOL
MUSIC TEACHING

PRINCIPLES OF MUSIC
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Printed and Published in Great Britain by C. A. Watts & Co. Limited,
5 & 6 Johnson's Court, Fleet Street, London, E.C.4, England.

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CHAPTER ONE

THE PSYCHOLOGIST LOOKS YOU OVER

I

THE psychologist turns from the detail of his researches, straightens his weary back, rubs his tired eyes, and looks at you—you, the average man of to-day. What does he see? What one thing about you impresses him most? *Your toleration in yourself of needless personal inefficiency in an age which requires efficiency.* He sees you spending eight hours or so each day on your job, playing various games, engaging in various hobbies, wrestling with problems which demand thought and imagination, studying this and that out of books—and doing all these things anywhere from a quarter to three-quarters less efficiently than you could! He sees you handling yourself in such a manner that easy undertakings become difficult and difficult undertakings impossible. He sees you failing to acquire all sorts of abilities which would be enormous assets to you, with no good reason for thus failing. He sees lost motion, incompetent self-direction, and its inevitable consequence—fifty per cent achievement.

Your case puts him in mind of certain modern developments in engineering. When the machine age was ushered in some two hundred years ago the great problem was to develop new sources of energy. And science gave us water-power, steam-engines, internal-combustion motors, and electricity. But now scientists and practical engineers are working in another direction. They are showing us how to use more economically the power that we possess. A most important device which they apply for this end is *streamlining*. It avoids and eliminates that resistance of wind and water which is but a puny imp when speeds are low, but which becomes a mighty and retarding demon when we travel fast. Because of it a ton of coal, a gallon of petrol, a kilowatt of electricity, will move us more swiftly and also carry us much

farther than ever before. Energy pays better dividends because it is not being frittered away.

Now, when the psychologist looks at you he is apt to think of all this. He knows that nature has given you just so much power. About that there is nothing he can do. He cannot revise your heredity or make you over afresh. But he also knows that if you really are the average man you are putting to productive use only a fraction of the power you possess. You travel far more slowly than you have a right to expect and not nearly so far. You are throwing away much of your native energy in overcoming what the physical scientist calls "parasite drag."

The psychologist knows how great are the pressures upon you in the rushing stream of our modern civilization. He is aware that you cannot increase your store of native energy or add to the number of hours in the day. All the more reason then, he believes, for you to make each moment count and to organize every effort for a maximum result. He is sure that you gravely compromise your own chances by permitting yourself all sorts of needless resistances, just as the power of a motor-car is used up by its square front end and vertical wind-screen and awkward wings and lights and straight-line construction—useless excrescences which it must shove through the atmosphere by main force. He contends that his gospel for you is very similar to the new gospel of his brother the physical scientist, and that it can be just as effective. He maintains that you can and should *streamline your mind*.

An old-fashioned car or an old-fashioned ship cannot be streamlined. They can only be broken up. But you are different. You can reorganize yourself. You can rebuild your mental contours. And this process of rebuilding, of streamlining, has an old and familiar name. *It is what we call learning*. Commonplace, do you say? Well, the psychologist does not think so. He has studied the learning process, and to him it seems a very wonderful and thrilling thing. There is much about it that he cannot explain. But he knows that determined and skilfully directed learning can achieve

miracles. He is no yogi, no faith-healer. He will not tell you that you can transform yourself over-night by making mystic passes in the air or muttering a magic word. His prescriptions are as common-sense as those of an old family doctor. But he has seen them work. He knows that when men are properly guided in their learning they move towards achievement with a speed, a completeness, and a success that are amazing. And when he looks at you, the average man, he is astounded at the meagre use to which you put this priceless inner resource which is so ready to your hand.

You take a job as a salesman and make a mess of it, and all you find to say to yourself is : " Well, I guess I'm not cut out to sell." You have been given executive responsibility, and things seem to be going not too well ; and your thought is, " Perhaps I lack executive ability." You are a student in school and not doing well at mathematics or science or Latin, and a sickly doubt is beginning to haunt you that you may have no head for such things. It would be very useful if you could work a typewriter, or do shorthand, or read or speak a foreign language ; but, alas, you cannot, and there the matter rests. Your handwriting is hardly legible, you spell quite shockingly, you use poor grammar ; and you are rather sad about it, but it seems like destiny. Some of your friends tell you that they find keen pleasure in looking at great pictures or listening to music ; you have to believe them, but how it is possible you cannot understand. As for playing music or painting pictures, the very idea that such things could be parts of your own equipment hardly occurs to you at all. You have heard that there are beings who earn as much as threepence a word writing for the magazines ; but they seem as far removed from ordinary mortals like yourself as archangels. It would be splendid to be able to remember names and faces, to play a good game of golf or bridge, to speak impressively in public. But all such accomplishments seem beyond you.

When the psychologist sees you floundering amidst such discouragements he draws in his breath and exclaims to himself : " What's the matter with this fellow ? What's the matter with his education ? Why in the name of common

sense hasn't someone made him really believe he can learn, and shown him how?"

For you can learn. Perhaps you cannot rise to the very highest levels of achievement. Perhaps you cannot become a Jascha Heifetz, or an Edgar Wallace, or a Bobby Jones, or an Einstein, or a Lloyd George. But the ordinary average person positively need not be defeated by any one of the challenges I have mentioned above, or by many others like them. When he is defeated it is simply because he has not applied his inborn power to learn.

And in order to acquire such abilities to a satisfying and successful degree you don't have to give up everything else and work for sixteen hours a day. Properly-directed learning gets results with a minimum of effort and in minimum time. It is not a grind: it is a thrill. You find yourself mastering your own resources, moving faster, travelling farther on a given expenditure of energy. What could be more fascinating? Psychology can teach you how to do this. Its gospel for you is the gospel of mental efficiency—the gospel of making the most of yourself. It can show you how to streamline your mind.

II

The psychologist who looks you over finds great interest and instruction in comparing the life of the average man with the outstandingly successful career. Within recent years he has been persistently asking this question, What makes men succeed? And he has been using a microscopic and painstaking analysis to find out. The answer seems to be that the successful man is the successful learner. At the start he may be ever so crude, ever so ineffective. But he disciplines and organizes himself. He shapes himself up and cashes in on his own gifts. He streamlines his mind.

For instance, it is a well-established fact that if somebody is to be picked for an opening leading upward the fellow who has proved himself a good learner is a far better bet than the man who may be at the moment his superior in knowledge and equipment, but who is set in his ways and lacking in enterprise.

The head of a great industrial corporation recently said : " In selecting recruits for our organization we are not much interested in the immediate knowledge a young man may have of the technical processes on which our work depends. We are interested rather in those who have a good general education, and who have graduated with high honours in stringent competition. We find that such men are able and usually willing to learn, and if so they can go far with us. . . . We want self-starters."

You probably know that every spring large financial and industrial concerns send out scouts to the best American colleges looking for the ablest seniors. These are exactly the sort of people whom the leading law schools, business schools, and medical schools are most anxious to secure. They may be very green and callow, very ignorant of what is before them. But they have come through a test, and proved themselves good enough learners to be worthy of a serious trial. There are never enough to go round. Now notice, I am not trying to prove to you the value of a college education. About that a great many things could be said—things on both sides of the question, for it has liabilities as well as assets. My point is simply this : Practical men, dealing with great responsibilities, anxious to find those best fitted to carry on their work, believe demonstrated ability to learn the most promising single sign.

Knowledge of this very practical psychological fact is by no means confined to any one country. Here is another illustration. The work of junior administrators in the Indian Civil Service is very difficult and responsible. A man must constantly decide complex points, involving a mesh of human passions, entirely on his own initiative. He cannot afford to make many mistakes or bad mistakes. It is very important to get the right people for the job. How then is the selection made ? Must the candidate study Hindu law and custom and pass examinations in the language of the country ? Must he show a competent book knowledge of sociology and administrative technique ? No, these are not the chief qualifications at all. He will be a man who has come up through one of the

great English Public Schools, who has done well at the university, and who has ranked high in an examination dealing largely with the Latin and Greek classics. This seems perfectly fantastic, does it not? And yet it works. For generations the Indian Civil Service has been a marvel of efficiency. And the reason is that it has managed to get hold of good learners. Latin and Greek may not "train the mind." Indeed, I am pretty sure they do not. But if a man has proved that he can learn Latin and Greek better than ninety per cent. of his fellows, he has proved that he can learn other things well also.

Having considered the evidence of careers in the making, let us cite the testimony of careers accomplished. All of it points in the same direction. The man of great accomplishment was not a great man from the start. But he was able to make himself great. He changed. He grew. He was a swift and able learner.

There is good reason for believing that when Abraham Lincoln came to Washington as President in 1860 he was by no means the supreme statesman whose name and wisdom are immortal. Many of the tirades of his enemies, much of the dubiousness of his friends, were not unjustified. But he had a priceless asset. He was a man of humble spirit, willing to sit as a disciple at the feet of the teacher, experience; and he learned greatly. Or for a closely parallel example, yet of a very different quality and calibre, consider the late Senator Huey Long. Everyone remembers how rapidly he was able to make himself a formidable national figure. Senator Long, like every new member of Congress, came to Washington with much to learn of the intricate game of national politics. And those in a position to know have said that his swift rise to prominence came about because he was able to master as much of the game in one year as the average man could in five or six. Frederick the Great, in his youth, was a dabbler and a diletante. His first battle was a muddle, ill fought, ill directed. Yet he made himself one of the ablest military commanders of all time, and Napoleon himself said of his greatest soldierly achievement, Rossbach, "That battle was a masterpiece." Up to the age of forty Julius Cæsar was an idle man-about-

town. Ten years later he was shining on the pinnacle of the Roman world, supreme as strategist and statesman. Beethoven was a grievous disappointment to his teacher Haydn, who saw no promise in him; and indeed his earlier work gives little intimation of what was to come. Darwin's schoolmaster declared that young Charles would never amount to anything. Henry Ford's friends thought him just another crank inventor. And even where great powers were early recognized and honoured, still we can see a gain of strength and depth and insight, a growth to new insight and new competence, a climbing towards the heights where masterpieces are achieved.

As we look back on such careers, understanding the beginning in the light of the end, they seem to me to bear out one truth above all others. Great men have been great learners. They have been great men because they were great learners, because they were not satisfied with limitations, because they treated problems as challenges rather than as terrors, because they attacked and overcame their own weaknesses. A very wise and learned commentator on human life, who devoted many years to the study of achievement, has written: "If a man have willingness to work, great power of work, and high intelligence, I can conceive of no combination of circumstances which can prevent him from achieving eminence."

Now, you and I may not be capable of *great* achievement. But here we have *the pattern of all achievement*. So many of us never make the most of ourselves. So many of us are, like the man in the parable, discouraged, believing that with only one talent nothing can be done! And we bury our talent in the ground. Yet how do we know what talents we have until we put them to work? In any case, something is sure to be accomplished. So by all odds and for all reasons the advice is sound: Use and cultivate your power to learn.

III

But is the advice practicable? Can one always learn? May it not be that success and failure are due to inborn ability or its lack, and that we can do little about it? Is an investment

in learning really sound and sensible? Or are we beaten before we start?

These questions are so reasonable and so important that I want to answer them very carefully. Let me emphasize that our ideas about learning are not the result of guesswork. The psychologist who studies you is not thinking in terms of fluffy idealism. His opinions come from literally thousands of painstaking scientific investigations and are based upon solid and genuine knowledge. To make everything as definite as I can, let me list a number of points which are well established by the research studies in learning.

1. It is quite true that individuals differ from one another in native ability. I do not see how any conscientious person can dare to deny this. One man may have a greater fund of native mental energy than another. And he will go farther *if he uses it effectively*. But that is a pretty big "if." Nothing can make a twenty-horse-power car perform as well as a hundred-horse-power car if conditions are equal. But what if the small car is efficiently streamlined and the big one is not? The fact that some people may have a bigger mental endowment than you is no argument for giving up. On the contrary, it is an argument for making every scrap of ability and power that you possess count to the limit.

2. In all the thousands of studies on learning only very few have failed to register some improvement. And usually the improvement has been very marked indeed. If one tries to learn, one succeeds. Streamlining one's mind is a perfectly feasible undertaking. This is the rule in the overwhelming majority of cases. And it applies in instances where the job of learning is so subtle and so unusual that it might well seem hopeless. You know that some musicians have what is called "absolute pitch"—the ability to name any note they hear immediately on hearing it. One might surely think that here is a pure gift of nature. Yet when scores of people, many of them not very musical, were given practice in hearing notes and then naming them from the sound alone, they all began to improve. Or again, subjects in laboratory experiments have been put to work practising the estimating of the lengths

of straight lines, and marking the mid-points of such lines. Once more, improvement always took place. And yet again, one might think that the power to solve puzzle problems was something born in a human being ; yet we know that it can be increased by practice. To give a list of all the jobs of learning where the possibility of progress has been demonstrated would be to catalogue practically all the experiments ever made—an impossible task. The cumulative evidence is overwhelming. And so, when anyone tells you, or you yourself are tempted to believe, that any particular ability cannot be learned—whether it be the appreciation of music, or legible handwriting, or good spelling, or the speaking of a foreign language, or æsthetic dancing, or guiding and governing other human beings—you should remember that every scrap of scientific knowledge we have points in the opposite direction.

3. Even when a person has been doing a thing for a long time, and has come to do it very well, he can almost always improve. In 1906 the world's record speed for typewriting was 82 words per minute, and the individual who made it declared it would never be surpassed. But this same woman raised her own record first to 87 and then to 95 words ; and a few years ago it stood at 147 ! Typesetters and telegraphists who have been on the job for twenty years, and who had long since ceased to make any progress or to believe it possible, have been put under special direction, and have markedly increased their speed of work in the course of a few months. Nothing is more remarkable in the learning studies than the evidence for the permanent possibility of improvement. One of the leading investigators of the learning process has declared that in most of the commonplace jobs of life—remembering names and faces, writing with a pen, doing mental arithmetic—we are from twenty-five to forty per cent. less efficient than we need be. There is no need to tolerate ineffectiveness in yourself. There is no need to believe that you have reached your limit.

4. Everything depends on how you set about a job of learning. If one just plods on and on, vaguely hoping for

something to happen, one is quite apt to be disappointed. But if one directs one's energies with intelligent insight, three things are almost assured—some progress is virtually certain, more progress than you expect is extremely likely, far more rapid progress than you anticipate is very probable. An interesting contrast has been drawn between the kind of learning children do in an ordinary school class and the kind of learning they do on very similar jobs when they are serving as experimental subjects in a psychological laboratory. In the school class the learning is apt to be slow, half-hearted, and not carried to any very high point of efficiency. In the laboratory not only is far less time consumed, but also far more genuine, solid, business-like progress is achieved. Why is this? Because in the laboratory, under the guidance of a skilled psychologist, the process is far better directed. We know that all sorts of things are being learned to-day both much faster and much better than once they were—reading English, using the typewriter, playing the piano, reading a foreign language, doing algebra. And the simple reason is that we know how to direct the process much better. In order to learn well you need to know how. But can you find out how? Indeed you can. An enormous amount of research material is on hand which can answer many of the practical questions you might wish to ask concerning self-direction, and which can furnish blue-prints for personal efficiency. It is the business of this book to make that material available to you.

5. You can learn to learn. To be sure, you cannot increase the endowment which nature has given you. If you have but one talent you cannot make it five. But you can use what you have. You can take up the slack. You can do away with lost motion. You can move in the direction you want to go. Learning is an art—an art to be acquired by intelligent, reflective practice. It is worth acquiring.

IV

There are all sorts of jobs you would like to be able to do with your mind—jobs relating to your vocation, your avocations,

your social relationships—jobs pertaining to your intellect, your imagination, your feelings. Why not set about making your mind do them?

There are all sorts of jobs you would like to do with your body—skills small and large, skills with fingers and hands, skills with arms and legs, skills of all-over co-ordination, skills in the direction of the eyes. Why not set about making your body do them?

These are the sort of questions the psychologist would like to suggest to you as he looks you over. He may feel inclined to address you somewhat as follows:

"Listen! There are but twenty-four hours in every day, and the number of days you have on this earth is not unlimited. So the more swiftly and completely you acquire the skills of body and mind which you need, the better. When you were born nature gave you just so much power, and I cannot tell you how to increase it. So the less of that power you must expend for a given result, the better. Here is where my science can help. I hold no charm; I have no secret knowledge; there is plenty that I do not know. But I can tell you how to learn far more quickly than you might think possible, and far more easily than you might think possible. I can show you how to set about learning many things which you may believe you cannot do at all. I can show you how to make your whole personality an efficient mobile instrument, how to capitalize yourself to the full. I believe this to be one of life's greatest lessons, one of the prime secrets of all success. My great and central word to you is this: Streamline your mind!"

CHAPTER TWO

THE GREAT ESSENTIAL: THE WILL
TO LEARN

I

ONE of the most striking results of recent psychological investigations is the growing conviction that *mere repetition is not a cause of learning*. If you want to improve a skill you already possess, or to acquire a brand-new one, do not rely chiefly on a lot of practice. Going over something again and again and again is by no means the surest and quickest way to master it. Indeed, if this is all you do, mastery may never come.

Practice makes perfect. How often we have heard that said! How sensible, how obviously true it sounds! How readily we accept it! If you want to improve your game of golf or bridge, play a lot of golf or bridge. If you want your handwriting to grow more legible, write a great deal. If you want to become an able salesman, go out and do plenty of selling. If you want to become more expert in appreciating art or music, see and listen to plenty of it. If you want to gain in skill at mental arithmetic, or at driving a car, or at using a typewriter, do these things *ad infinitum*. To gain ease and facility as a public speaker, address audiences without end. To become able to meet and manage people effectively—well, meet and manage them. Could any advice seem saner? How can one question it?

Yet if we stop taking things for granted, and dig down a little into the actual conditions and effects of practising and repetition—which, of course, is exactly what the experimental psychologist does—some very curious and arresting difficulties begin to emerge. For instance, it is quite obvious that one may repeat a performance innumerable times without improving. You walk a great deal without becoming a better walker—although your walking skill really could be improved.

You drive a car thousands of miles and yet certain faults cling to you. Your game of golf stays about the same year after year. And, although you meet a great many people, your small mannerisms and little shynesses persist, and the weaknesses of your approach remain unaltered. Bad spelling often seems like destiny ; so does a person's capacity for not remembering the names and faces of others. And handwriting, which I mentioned above for this very reason, not only does not seem to improve with excessive use, but actually to deteriorate.

Most assuredly, then, one cannot count on repeating to bring improvement. And further analysis sharpens the paradox still more. A certain experiment was set up in which the subjects had to learn to solve a complex problem. The problem was devised in such a manner that choices had to be made between 1,024 variations. 1,023 of these were wrong, and led to failure. Only one was right. In every case each subject made enormously more errors than successful efforts. And yet the solution was always learned. The subjects learned what they did not repeat—or, more precisely, they did not learn what they repeated most. Now in this experiment we only see more clearly what we already know well enough from ordinary experience. Take any bit of learning you have ever done, and ask yourself if you didn't make far more mistakes than successful tries. Then ask yourself why you learned the successful procedure instead of the far more numerous mistakes. The beginning golfer fails with far more drives than he hits ; but still he learns to drive. The inexperienced salesman makes all kinds of ghastly blunders ; but still he may become a star of the road. Any executive, any teacher, anyone responsible for guiding and directing others, knows perfectly well that beginners are going to make errors, and indeed, at first, mostly errors. But he knows also that the beginner can very likely work out of his errors. Yet if we learned only what we repeated—if the more we repeated the more we learned—if repetition were the cause of learning—this would not be possible. In fact, there is something positively self-contradictory in the very notion of repetition

as a cause of learning. For when we start on a new skill we just precisely cannot perform it at all. There is nothing to repeat !

And there is still more to come. Ask yourself this : When you have learned something, just what have you learned ? Does this seem a preposterous question ? Does the answer seem obvious ? Let us take a very simple illustration which will help us to see its point and the intriguing problem it poses. One of your best-established skills, acquired long ago, is the ability to feed yourself with a knife and fork. Again let us ask just what you have learned here. Must your knife and fork always be in exactly the same spot beside your plate ? No, of course not. Their position on the table can differ quite a great deal without confusing you or reducing you to helplessness. Your skill need not run in an absolutely unique and narrow groove. Again, must you always have the same knife and fork ? Once more, certainly not. Or when you say you can use your knife and fork do you mean that you can feed yourself steak, but not roast beef ? Or steak and roast beef, but not potatoes ? These questions are preposterous, are they not ? Of course you can use your knife and fork in any one of a tremendous range of different situations. That is what you mean when you say you can use them at all. But did you have to practise each one of these different situations ? If you went out to dinner and were given a new kind of fish, would you have to learn to eat all over again ? Certainly not ! But then what about good old repetition ? You feel quite sure you could do a great many things with a knife and fork that you have never practised. You may have practised doing one thing with them, or ten things with them, but hardly an indefinite number of things. And being able to do an indefinite number of things with a knife and fork is exactly what you mean by being able to use them.

Now, this is invariably the way with learning. When you say you can drive a car, you don't mean that you can drive only one particular car in one particular direction and at one particular speed. When you say you can meet and deal with

people, you mean that you feel confident of mastering new, unfamiliar challenges. When you claim to be a competent salesman you assert your ability to grapple with the unforeseen problems which prospects as yet unknown may throw at you. You cannot, in the very nature of the case, rehearse all these things ahead of time. Repetition cannot be the formula for learning such skills.

Just, seriously, try to build a worth-while skill by repetition. You run an excellent chance of making a fool of yourself. You have a difficult conference ahead of you, and you rehearse your arguments again and again. Then the discussion takes an unexpected turn, and you are helpless. You carefully memorize the ten opening moves of a game of chess—and then your opponent does something unforeseen. You write out and memorize a speech word for word. Something happens to make you forget, and the whole unstable house of cards collapses. No! The formula of learning by repetition is not only theoretically untenable; it is a most perilous and misleading guide to practical mastery.

II

Now let us turn our attention from what does not cause learning to what does cause it. Having seen what you ought *not* to do, let us see what you should do in order to learn well. We have a great and impressive array of evidence which goes to show that the will, the intent of the learner determines whether he learns, how well he learns, and what he learns.

Two psychologists set to work memorizing lists each containing a dozen nonsense syllables. (Nonsense syllables are used so that the learning shall be absolutely "by rote.") When they concentrated on learning as fast as they could it took one of them an average of nine and the other an average of thirteen repetitions to memorize each list. But when they just went through the lists, repeating them without any definite intention at all, one needed an average of eighty-nine and the other an average of a hundred repetitions for each. This

enormous difference was due to nothing but the presence or the absence of the will to learn.

In a class of college students a list of twenty English words was written on the blackboard. The members of the class were asked to copy them down. Then, without any warning having been given, they were told to cover up the words and write them out from memory. A few days later the experiment was repeated with another word list; but now the class were told that they would be asked to try to recall them. This was the only change made, but the students remembered thirty per cent. more of the words: with no alteration save in this one critical factor of purpose, the whole memory process was made more efficient.

Two groups were put to work memorizing nonsense syllables. One group were told that they would be asked to repeat the nonsense syllables immediately after the learning was over. The other group were told that they would be asked to repeat the material after an interval of two weeks. Both groups were tested immediately after learning, and there was hardly any difference. They were tested yet again after two weeks. And now the second group knew over twenty per cent. more syllables. Both had started even; but their mental workings were differently set, and they came out with different results after the lapse of time.

I have cited three very impressive experiments dealing with memory, and showing the tremendous influence of the will to learn. But many investigations have been made dealing with other types of learning, and yielding much the same results. Nearly forty years ago a very important study was made on learning the Morse Code. Sending Morse involves both memory and a certain modicum of physical accommodation. Among the subjects were a group of men who had been professional telegraphists for as long as twenty years. They were all rather third-rate operators, stationed in small out-of-the-way towns because they had never been able to work up to the minimum "main-line speed." And they were all resigned to their fate, convinced that it was hopeless for them to try to better themselves. Yet no sooner did the psycholo-

gists catch them, isolate them in the laboratory, and place them under strong stimulus and encouragement, than they all began to improve.

More recently a psychologist put two groups to work practising the simple artificial trick of writing small letter "a's" along a line fast and accurately. Both groups repeated the task seventy-five times ; but one of them was specially stimulated by being told at intervals how well the work was going—by being shown scores, that is to say. The other group just repeated, without knowing its own results. And the "stimulated" group did very much better.

Many studies have been made of the processes of learning to do puzzles, answer riddles, and solve problems. And they very clearly bring out that successful, effective, rapid advance depends on the active "attacking" attitude of the learner.

The results of learning to read the English language are so extraordinary and so important that they deserve special comment. Most of us, I suppose, think we can read at least fairly well. How fast can you read? Do you know? Get some friend to hold a stop-watch while you read five pages of this book at about your normal rate. Then divide the time in seconds by the number of words. Or time yourself on an article or story in one of the papers, where the "reading time" is indicated. Or notice how you react in a cinema, and whether you seem to read captions and other notices about as fast as the crowd, or a little slower, or a little faster. This will serve to make concrete what we are talking about when we speak of reading rate. Now, it has been found possible for grown-up people—not children, who might be expected still to have much progress to make—to double their reading speed in the course of about six weeks. And the most important condition of so doing was just a deliberate purpose, an intense and directed desire to bring the result about.

It has been said that no man, by taking thought, can add a cubit to his stature. This no doubt is true. But a man, by aroused and deliberate intention, can increase his efficiency prodigiously. You are introduced to a stranger ; you are told

his name ; and you wish to remember it and to connect it with his appearance so that you will know him later on. Make a deliberate, conscious attempt to do so. You are going to be given a new job and in order to keep it you must acquire some skill which as yet you do not possess. Concentrate intensely on gaining it, for the concentration will be a cause of success. You wish to be able to read Spanish. Very well ; while you are working at your Spanish, work one hundred per cent. You have to deal with a social situation which baffles you, with which you feel unable to cope. Waste no time in repining or self-pity or despair. Tell yourself that you are going to master it ; give yourself over wholly to the job of learning how to do so.

By far the most common cause of bad and ineffective learning is the absence of an aggressive will to learn. Many people hardly seem to know what it means to concentrate. They take twice and three times as long as they need to do a job ; and then it is only half done. They feel over-driven, overloaded, crowded for time, not because they really have too much to do, but because they are not handling themselves properly. Observations of children working on tasks in school, of students studying in libraries, of clerical workers in offices, abundantly prove the point. They fuss and fume and scatter their papers and break their pencil-points, and drop their books and stare out of the window, and gossip with their neighbours, and look at the clock, and scratch their backs—everything but concentrating on the job. And then they bitterly complain that they have too much to do. They are falsifying the primary and essential condition of all learning and all effectiveness.

Moreover, the absence of the will to learn explains why we repeat so many things without improving. I mean such things as handwriting, spelling, arithmetical computations, remembering names and faces, driving golf-balls, giving executive instructions—things that people can do thousands of times without doing them any better. If you just perform a function without any thought or intent, you run it off without getting any better. But the moment you isolate it as a chal-

lenge to learn, and make up your mind to do it better and better—it begins to improve.

This is far from all I have to say about the will to learn. There are many qualifications and explanations still to come. But it is crucial and essential. As one writer very truly says, "It is intense effort that educates."

III

In the absence of the will to learn there will be no improvement. If one just keeps on doing something again and again—playing golf, selling insurance, directing people at their tasks, listening to music, writing the English language—without actively wanting to do it better, learning does not take place. One must feel every job, whether of work or play or social intercourse, as a challenge to learn. This is the absolutely essential condition. But is it enough?

You would like to take ten strokes off your golf game. You wish you were as expert and ingenious a salesman as Jones. You say you would give much if you could write as good and forceful a letter as Smith. You think it would be fine to turn out marketable short stories. You envy Robinson his *savoir faire* in meeting and dealing with people. But you are pretty well convinced that such achievements are not possible for you. Perhaps you have even made a few sporadic tries. Perhaps indeed your tries have been more than sporadic. And yet they have not been crowned with success. The desire to do better is with you more or less every day. But it is a frustrated desire; it gets nowhere. Such experiences are common enough. What do they mean? Must we conclude that the alleged will to learn is an illusion, that the real secret of success is being born with a special ability, and that all you can do is to accept whatever luck or ill-luck nature may have dealt out to you?

I do not think that this is the correct conclusion. On the contrary, it seems to me clear, from the large body of knowledge which experimental research has accumulated, that we must distinguish between the *wish* and the *will* to learn.

There is all the difference in the world between having a sort of general desire to improve and setting out in a confident and businesslike manner to realize that desire. So far as one can tell, the great majority of people hardly care about learning or improving at all, except now and then and here and there. They are fairly comfortable, fairly content, satisfied enough to carry on under the slogan "Business as usual." For them there will be no marked improvement with the passage of time, in spite of endless repetitions. They never become better business men, more tactful, more skilled, more expert, more inventive; and the reason is that they are willing to accept themselves as they are. A smaller number, though still perhaps a great many, have a pretty definite wish to improve their capacities in various directions. They are dissatisfied with themselves, and would like to do something about it. They read an occasional book on golf or salesmanship or public speaking or managing men. They have some stirring of ambition, some desire for greater proficiency. Such cases are hopeful, yet not more than hopeful. Something else is still required. Before anything striking can be achieved the general praiseworthy and defensible wish must be transmuted into the directed, intelligent will.

Yet even the wish to learn is important and worth while. For this we have some interesting evidence. Studies have been made to find out to what extent interest in a subject is a guarantee of doing well with it. The investigations dealt with the performance of students in school, because this is so accessible and convenient for scrutiny, but the results obtained apply everywhere. It was found that if a person is studying four or five subjects he will do better with those in which he is interested than in those in which he is not. Moreover, it was also found that if he had been interested in a subject for many years he was likely to do very decidedly better with it than with those with which he had not been interested. As to the reasons for this, one may give all sorts of guesses. But at least it shows a close relationship between achievement and the wish to learn—interpreting interest as a wish to learn, which seems legitimate.

However, the investigations also yielded a negative result and revealed a limitation of great significance for us. If a person is working at typewriting, mathematics, music, and carpentry, and happens to have a long-standing and powerful interest in mathematics, while he is bored with the other three, then his achievement in mathematics is apt to be high *compared to his achievement in typewriting, music, and carpentry*. But still he may not be a tremendous or outstanding success at mathematics. There may be plenty of other people who will beat him even in his chosen and best-loved field. All we can say is that he himself is likely to be better at mathematics than at the rest of his studies. This seems rather discouraging for a moment ; yet when we reflect about it it is natural and reasonable enough. He may be interested in mathematics ; but what if he has to compete with people who are very much more interested ? What if he has to compete with people just as interested but brighter ? What if he has to compete with people who dislike mathematics but who are extremely brilliant ? This is part of the reason. But there is also something more. He likes mathematics. Very well ; but does he do anything about it ? Does he just like it ? Or does he actively and ingeniously set himself to master it ? Is his interest only a wish to learn ? Even so it will indicate something. But it will not become a mainspring of progress or a reliable guarantee of real success until it is transmuted into will.

What, then, is the difference ? The wish to learn is diffuse and general ; the will to learn is concentrated and specific. The wish to learn means that we repeat a thing again and again hoping for something to happen ; the will to learn means that we dig down and analyse, that we try to find out exactly what is wrong and exactly how to put it right. Let us take an analogy. A man may have a wish for better physical health and strength. His wish for health becomes a will to health only when he finds out what he must do to become more healthy, and then does it. So the will to learn means an intelligent and persistent search for the conditions of improvement and an intelligent and persistent concentration upon them.

Innumerable illustrations can be assembled to make the

point clear. Very striking ones are furnished by athletic achievement. Up to a few years ago certain records set for throwing the hammer and long jumping had never been surpassed. Then quite suddenly a great many athletes began to better them. What had happened? Had human beings suddenly become stronger and more active? That could hardly be. What had taken place was the discovery of a new technique, a new "form." And how is a new "form" discovered? Much as Edison discovered the incandescent electric light—by persistent seeking, persistent attempts to get at the point. Edison's will to invention was precisely this intelligent seeking. And so also the will to learn is intelligent seeking. You will recall my illustration of the progressive increase in speed in typewriting over a period of many years. This too was brought about by finding new and better techniques, by a better understanding and organizing of the essential controls. Such is the case with all learning. You persistently slice your drive at golf. Something is wrong. You haven't caught the "feel" of the swing. And you must catch it before the fault clears up. You constantly fumble your approach to a sales prospect, or stumble in making a speech, or mis-spell words, or make absurd errors at bridge, or lose your way in the woods, or get into trouble with mathematical problems, or forget people's names. Always you may be sure of one thing—*excellence of such accomplishments is easy if you find out how.* A big "if," do you say? Quite so. But there is the very heart of learning. To learn is to find the way. To have the will to learn is to seek it. To have the wish to learn is only to desire it and to sigh because you do not know it.

Now let me focus on an idea which has permeated this whole chapter. I can put it very briefly. *The will to learn is the essential secret of streamlining your mind.* It saves time which would be wasted on vain repetitions. It saves energy which would otherwise be dissipated and fruitless. It makes you dissatisfied with a mediocre result—and only an effective outcome is worth learning for. It brings us to the very centre of the entire business of self-direction. The intelligent

direction of the will to learn will occupy us much in the succeeding pages.

IV

However, there are one or two items of practical advice that should be given before we turn away from our broad consideration of the subject. Success in learning depends on setting up a goal. The goal defines the will and makes it real. Investigation has shown that some ways of setting up goals for learning are better than others. From its results we can derive three points of very helpful counsel.

1. In any job of learning, do not allow yourself to become discouraged. Do not allow anyone else to discourage you. And if you are directing the learning of another person—that is, teaching him—do not deal in discouragement. It has been definitely shown that people improve much faster if they are made aware of their successes and praised for them than if their attention is called to their failures and they are blamed for them. This is neither guesswork nor idealism. It is one of the facts that we know about the learning process. Discouragement is harmful. Scolding is harmful. Sarcasm is harmful. Punishment is harmful. Surely we can see why. Our business is to promote an intelligent, positive, exploring will; not to make others or ourselves feel like “duds.” To feel like a fool has never, in and of itself, helped anyone to improve. The very most that it can do is to develop a rebound. But if you want to shoot a bullet at a bull’s-eye you would hardly try deliberately to bounce it off the wall of the gallery.

2. In any job of learning measure yourself against others. Competition is helpful. Of course it should be reasonable and intelligent competition, not a boiling up of hatred, envy, and malice. Watch to see how well others do. You, after all, are the same flesh and blood as they. Watch to see whether you can catch the secret of their success. Watching others can give you the measure of your own achievement. It can show you that there is still plenty of room for improvement—sometimes the isolated worker never realizes this, or

realizes it only very dimly. And it can give you most valuable hints about how to improve.

3. In any job of learning test yourself at frequent intervals. You are reading a book which you wish to master. Don't leave it to chance. Think out twenty or thirty questions, and then write down the answers. You want to improve your speed on the typewriter. Get a friend to time you with a stop-watch every other day. In some complex abilities a test is hard to devise—selling, executive action, social intercourse. Yet with ingenuity you may find a way. And it has been shown again and again that knowledge of the results of one's own effort is a most valuable means of organizing the will to learn and of bringing about improvement. It defines what has been accomplished and points the way towards further achievement.

CHAPTER THREE

FUMBLING, FOOLING, FAILING, SUCCEEDING

You have, let us say, a wish to learn. You would like very much to take ten strokes off your golf game, or to write more legibly, or to remember the names of people you meet, or to draw cartoons, or to compose short stories, or to use the typewriter, or to speak in public. More than this, you are quite determined to tackle the job. So you have passed beyond the stage of mere wishing. A real will to learn has begun to build up. But still you have only started. Your will to learn must become stronger, more definite, more intelligently directed towards the crux of the problem. On this your success depends. You must organize your will to learn. How should you set about doing so?

The best general advice I can give you, which will become more specific later on, is this: Make a start! Begin! Write a story. Get up and make a speech, even if only for half a

minute. Exert yourself to fix in your memory the name of the next person to whom you are introduced. Draw a picture. Go out to the practice tee and concentrate. Set down ten lines of handwriting as perfectly as you are able. Whatever the job you have in mind, get busy at it.

"But," you say, "what has all this got to do with the will to learn? You are simply telling me to practise. You are right back to what you called a fallacy at the beginning of the last chapter. You are saying that I learn by *doing*, by *repeating*."

Indeed I am not. Please notice that I did not say "Practise the job." I said "Tackle the job." I said "Make a start." And that is something entirely different. We have seen that a man may repeat a thing endlessly without improving. But on the other hand he will not improve if he never tries it at all. So do not go in for a great deal of repetition at first. Set up the undertaking at which you wish to do better, and try it out once, twice, or perhaps three times. Mere repetition is not what you are after. The number of times you try is not the important, the determining, consideration. The important consideration is the intelligence with which you try, and above all what you yourself discover from your tries. You need to find out on what points you must concentrate. And these early efforts are surveys of the field you wish to conquer. A scientist or an inventor in his laboratory, seeking for a new device or natural law, comes little by little to narrow down his search. This is exactly what Kettering did when he made the first self-starter for a motor-car. He tried first one thing, then another, then another, and rejected them. But his efforts were never haphazard. And when one way of approach was blocked, the very failure in itself suggested a new line of attack. There is the attitude to have in learning. Any job of learning is a process of experimenting and discovering. Kettering would never have constructed a self-starter if he had sat back in an armchair and tried to figure the thing out on general principles. He had to go actively to work with tools and hands as well as with brains. But neither would he have succeeded if his endeavours had been stupid, or if he

had kept on and on after a method of work whose failure had become manifest, or if he had trusted to chance like a dice-thrower. As he worked, the essential point of the problem became more and more clearly defined until at last it was solved. So with any bit of learning we must locate and feel out the difficulties. We must develop a more and more accurate "hunch" as to what it is that makes us forget the names, or slice the golf ball, or mis-spell the words, or write pointless fiction, or fool around like idiots when we address an audience. We must find out where and how to apply ourselves. And this is exactly what I mean by *organizing the will to learn*. We define our goal more and more specifically until we can say: "If I can succeed with just this one thing the trick is done." And then one day—it happens! You cannot learn by doing. By doing you define and organize the will to learn.

II

I expect—and indeed I hope—that the advice to start right in on the job, to take a running jump into deep water and splutter around, will raise quite a number of doubts and questions in your mind. This is as it should be; and, as we consider and try to answer such doubts and questions, the advice itself becomes more specific and practically helpful.

First of all you may say this: "If I begin simply and directly by trying to do what I want to learn to do better—driving a few golf balls, writing a more legible hand, using a typewriter, introducing a new note into my personal contacts, behaving differently to my wife's relations—am I not very apt to make many serious mistakes? And is not this a very sad and serious business? For may I not learn the mistakes? May I not form bad habits from which I shall never recover and which will for ever block the improvement I seek?"

Here is a very common misgiving about the learning process. It is the fear of what is sometimes called "practice in error." And some very good teachers make a perfect bugbear of it. For instance, one of the greatest living pianists tells his pupils

never to tolerate a mistake in practising a piece, and insists that if they make one they begin all over again. Also if you have gone to a business college you know that the typewriter instructor often requires students to go back and re-write a whole page whenever an error occurs. This last illustration, however, differs from the first. I mention it only because it may have come within your experience and needs clearing up. The first has to do with the crude beginning of a new skill, the second with putting a final polish on it. For the time being we are dealing with the beginning, not the end, of a job of learning. We are asking how to organize the will to learn in a preliminary way, not how to put the finishing touches on an almost perfected ability. (This of course will occupy us later.) And, as I say, many teachers and many learners have a perfect horror of mistakes at the very outset, and think them inevitably fatal to progress.

Now there is no doubt whatever that if you start your learning by simply trying to do whatever you want to do, you will make plenty of mistakes. Indeed, you will make far more mistakes than anything else. Also there is no doubt that if you keep on with the "try, try, try again" formula these mistakes may stick to you and block, or at least greatly impede, any betterment. But that is exactly the thing not to do. The way to avoid practice in error is not to avoid the errors but to avoid the practice! Stop thinking of these early clumsy efforts as practice. Think of them as experimentation. You are not trying to grind something into your nervous system. You are trying to find the answer to a conundrum. Once you take that attitude errors cease to matter very much. Of course they are unfortunate and a nuisance. It would be splendid if we could learn a difficult skill the very first time. But we human beings are just not made that way. A learner is rather like a man in a dark room who knows for a moral certainty that there is a way leading out, but is not sure where it is. He fumbles and gropes about, barks his shins on the furniture, bangs into the walls, and knocks the ornaments over. He may get angry and curse; he may grow discouraged and sit down and give it up. But never for a moment does he

become afraid lest he may be acquiring a fixed habit of barking his shins, and bumping walls, and knocking vases off the shelf. The only point at which my metaphor seriously breaks down is that the learner does not behave nearly so blindly or blunder on so nearly by chance as our temporary prisoner. The will to learn is much more susceptible of intelligent organization than the will to escape.

Don't be afraid of mistakes, *so long as you keep the experimental attitude*. No one ever learned anything worth while without making a fool of himself in the process. From your early errors you can gain a great deal. You can begin to see what will not work. And above all you can begin to see why it will not work. And there you have the first necessary stage of finding out how to succeed—of effectively organizing the will to learn.

But this experimental attitude is not easily maintained. It is in general far easier to be stupid than intelligent, and to relapse from self-analysis into mere repetition. In the research studies on learning a factor emerges again and again that has been called *the persistence of error*. This phrase was coined by an investigator who traced in his laboratory the process of taking to pieces wire puzzles. One of his subjects would pick up a new puzzle and start to manipulate it to remove the key. A certain method of attack would develop, and he would work the key up into one corner and act like Bruce's celebrated spider, persisting endlessly. Finally the experimenter would in mercy point out that as long as the key was kept in that particular corner the task was hopeless. The subject would agree, and change his tactics. Five minutes later the experimenter would come along again and there would be the key once more in its old *cul de sac*, with the subject knitting his brows, running his tongue out of the corner of his mouth, and getting steadily more and more red in the face. Here we see the lapse from experimentation into blind trying. And we find it continually. A great many persons have a pet list of words which they mis-spell, and that list is so sharply defined that it is called their "vocabulary of spelling errors." Pupils in algebra are not impartially prone to every possible

mistake ; they specialize in certain mistakes and repeat them with remarkable ability. The same is true of students of foreign languages. One can be positively haunted by a few quite definite typewriting errors, which one commits again and again and which seem to refuse to respond to practice. One pays one's good money to a professional to have imperfections in one's golf swing cleared up ; one quite agrees with his diagnosis ; and on the third tee comes a sad relapse. One makes a radical improvement in one's handwriting, and when one is a little tired the old scrawl appears once more. So those who fear the effects of practice in error are by no means altogether foolish. Errors are very dangerous indeed, very prone to block improvement, unless one can hold the experimental as contrasted with the blindly repetitive attitude. You must be on your guard against the insensate tendency in human beings to start banging their heads against stone walls, and, indeed, to keep up the performance until sheer pain and misery and despair make them stop.

III

I remember once seeing a starling spend an entire afternoon flying against a window in which it saw its own reflection. Nothing we could do would drive the bird away. The learning process is apt to run into exactly such an impasse. How then can we guard against it ? Psychological research has a number of valuable suggestions to offer.

1. Make your early tries very easily, very slowly, very calmly, and with as little anxiety as possible. At the start of a task of learning never push yourself. Don't worry about making mistakes. Your business at first is not to perform perfectly ; your business is to feel yourself out on the job. In one very ingenious and illuminating investigation the subjects had to learn a difficult and intricate physical skill which occupied them for many weeks. Some of them were told to work very slowly at the beginning, trying to avoid errors but not worrying unduly if some occurred, and above all not attempting speed. They all came through to ultimate

success. Others again were told to work at full speed, forcing themselves to the limit. And of these not one ever managed to master the skill.

The force of this discovery should instantly impress anyone who has ever set out to acquire a motor skill, such as playing tennis or golf. What hinders the beginner most is not the clumsiness of his muscles, but the faulty attitude of his mind. At work on the practice tee or against a wall things go fairly well. But the moment he starts to play a game the tender co-ordination falls to pieces. He is no longer thinking of the feel of the movement and letting results happen as they may. Results dominate his mind. He is trying to make long straight drives or to hit the ball fast and low over the net. The experimental attitude vanishes, and with it his hold upon his only clue through the labyrinth is lost.

To most of us this much is an old story. We have all been told not to press, not to force ourselves, to relax. And we have experienced the instantaneously fatal effects of pressing and forcing. What we do not so generally recognize is that here is a universal principle of all learning. Perhaps you want to learn by heart a poem or a bit of prose. A most valuable piece of advice—exactly like the advice of the golf professional—is, *take it easy at first*. Let the rhythms, the turns of expression, the shades of meaning soak in. Give yourself time to feel, to appreciate, to understand fully what you wish to learn. When an actor is what is called a “fast study” it means, among other things, that he is able to hold this easy relaxed attitude even under pressure—even though he knows that in a few hours he must go on the stage and play the part. Forcing is just as bad in memory work as in golf.

The very same thing is true everywhere. If you have a speech to prepare, or a great deal of stuff to read and digest, don't let anxiety get the better of you. If you want to learn how to solve knotty problems in mathematics or elsewhere, don't try to swallow an enormous dose of practice in a very short time. Take a few easy problems and let your mind play with them. Your first job is not to solve such problems at record speed, any more than the first job of the beginner at

golf is to drive a ball two hundred yards. Your job, like his, is to catch the "feel" of the right way. If you want to improve your sales approach, don't rush hectically through a long list of prospects. Select a few where your chance of success is good. And when you go to them don't be so much anxious to sell as to sense the sales situation and to gather "hunches" about what makes you succeed and what makes you fail. A four-years college course usually has the effect of wrecking a person's handwriting. The reason is that he is continually compelled to overstrain the skill. Over-exertion, quantity practice, anxious repetition, desperate concentration on immediate results—these are the enemies of perfect achievement. They can completely frustrate improvement if you permit them *early in the learning process*. (Note that qualification; its great importance will emerge later on.) Give yourself a chance. Do not practise. Experiment.

2. Here is the second suggestion which psychological investigation offers us for the preliminary organizing of the will to learn. Always try to vary your procedures. There is neither virtue nor wisdom in sticking doggedly to a method which will not work. Your task is to discover how and where intelligently to apply the will to learn.

Because of the strange fact of the persistence of error you may find it necessary to make very deliberate and conscious plans to force yourself to vary your approach. Here is a procedure invented by one of the ablest people I ever knew when he got a job as a salesman and made up his mind to succeed with it. He read books and articles on selling, talked to other salesmen, and gave the matter careful consideration. He behaved almost like a general planning a campaign. Then he mapped out as many entirely different modes of sales approach as he could imagine. And he experimented with his first dozen prospects. He made rather a lower percentage of sales at first than some other men. But he developed into a star. He found out how to sell.

Here we have another universal principle of efficient learning. It is applied by the very best teachers in our schools. In teaching elementary mathematics, for instance, the idea

is not to have a pupil cover as much ground as possible. Rather it is to have him take a few problems and experiment with different approaches until the right one emerges. So with all learning. If you wish to improve as a public speaker, never prepare two speeches in the same way. You have three chances at three different audiences. Very well! The first time write out and learn by heart the opening and closing remarks, outline the rest, and have your notes before you. The second time write your speech out word for word and burn your manuscript before you succumb to the temptation of trying to memorize it. The third time start preparing four days previously to the event and think your speech through very carefully each day for three successive days, but don't write down a single thing. After these three mental rehearsals resolutely put it out of your mind and don't even give it a thought until you rise and face the audience. You may make a fool of yourself? Perhaps—though I doubt it. But that is not the point. *You are learning to speak.*

But you may say: "Perhaps what at first seems a hopeless method is really the right one. Perhaps if I stayed with it a while it would lead to success. How can I tell? How long should I persist with a method of approach that seems to yield no promising results?" Not very long at first. Your job is not so much to find out *the* right method as *your* right method. Your method of making a speech, clinching a sale, memorizing a poem, writing a story, or driving a golf ball is almost certainly not quite that of any other person. At the same time it is quite true that what turns out to be the ideal method for you may seem strange and uncomfortable and unpromising when you try it first. When a real expert, an expert not so much in doing as in teaching, recommends a method to you—when he tells you to talk to a sales prospect, organize a story, hold a golf club, look at a picture, thus and so—take his advice very seriously even though it seems foreign to your inclinations. But do not believe that he can show you the one and only way of salvation. If he is a real expert he himself will know that there is never one unique and inevitable method of doing anything important. He will help

you to vary your approach and will suggest variations which might never occur to you. But as a general thing your danger is not that you may try too many variations, or flit with undue *insouciance* from one procedure to another. Your danger is fixation.

3. Now for our third suggestion on organizing the will to learn. Think more than you act. Analyse as best you can what you are going to do before you do it. When you have tried your job over a few times, stop and analyse again. You have more to think about now, and should be able to help yourself better. The "feel" of the performance has begun to establish itself. The conditions of failure and success are starting to declare themselves. Your will to learn can become more intelligent.

Here is the way a certain man trained himself to become a first-rate aeroplane pilot. In his early stages he would think, both before and after a practice flight, of every imaginable contingency. What would he do if this happened? Or if that happened? Or if some other sudden demand were made upon him? Later on he was noted for his instantaneous presence of mind, and he attributed it largely to this self-schooling. He had learned presence of mind by quietly rehearsing emergencies. Apply the same thing to your car-driving. What would you do if a child ran out in front of you at a place where there was a bad ditch by the road? Would you act in the same way if you were alone in the car and if you had your own family with you? If instead of taking the ditch you would have to hit another car? A school bus? A crowd of pedestrians? A man in a tight place does the right thing like a flash. We exclaim at his nerve and expertness. But how did he acquire those qualities? By learning.

Never merely practise. Always try over the job on a background of careful analytic consideration. A good teacher can help you partly by supplying such a background, by showing you how to analyse better than you could alone. But, if you have no teacher, analyse for yourself. Read instructions and suggestions. Reflect about them. Carry them further than the book, and shape them to fit your own peculiar needs. A

certain painter who achieved marvellous colour effects was once asked with what secret substance he mixed his pigments. His reply was : " With brains, sir ! "

IV

I have said a good deal about failing and fooling and fumbling because they are inevitable parts of the learning process. We must be willing to accept them. And we must manage them properly and intelligently. Through them the will to learn gains focus. And yet we do not ultimately learn by failing, fooling, and fumbling. We learn by success. To recognize success when it comes, and to see how and why it differs from failure, is of the utmost importance. Only so does the will to learn achieve its final definition. And this idea adds the keystone to the arch of our present argument.

One of the most extraordinary things about learning is the emergence of success. I know a man who, during his college course, was required to take two years of Latin. He hated Latin and did very badly with it. At the end of his first year he was almost failed, though his record elsewhere was brilliant. Then he set doggedly to work to master the stuff. He devised an exacting and thorough method of study. Taking each rule of grammar, he found three Latin sentences which illustrated it, and memorized them. For a long time he plodded without any result. The examination at the end of the second year was approaching and he felt much discouraged. A part of the test consisted of some paragraphs of difficult English to be turned into Latin, and such a proposition was his chief bugbear. Then something happened. Everything he had learned seemed to fall into line, so that he wrote, almost without effort, a brilliant and correct piece of Latin prose. The examiners were astounded, but no more so than the man himself.

That is quite characteristic, though the happening was more dramatic and more opportune than usual. You fail and fumble and experiment. You hit on a method that seems promising. You stick to it, but nothing very satisfactory happens. Still something tells you that you are on the right

road. You commit yourself more and more deeply, though doubts press upon you thicker and thicker. Then quite suddenly the solution crystallizes and you have arrived.

But have you really arrived? Had this man really learned to write Latin prose? Strange to say, he had not. Encouraged by his success, he went on and took more Latin in his third year. But he could not manage to repeat his performance. Was it just a flash in the pan? Before answering this question I want to present another actual case.

A man made up his mind to learn to speak well in public. His first few efforts were quite miserable. He was paralysed by nervousness and almost utterly ineffective. Yet he stuck to it, and reflected and experimented much in the way I have suggested. Then one day he found himself before an audience with an address prepared, and quite without any warning it went like a house on fire. He was amazed, almost intoxicated, by an absolutely new experience. Yet the next time he spoke he could not duplicate it. But emphatically he had learned something. He knew that he *could* speak. The clouds had broken for a moment and he had caught a glimpse of the sun. He persisted, and after a while came another success. It was followed by more failures, but they were fewer. As he went on, success became increasingly the rule. And he is now one of the most brilliant and effective orators in America.

Could our college student have achieved the same success with his Latin? I believe he could. Indeed I would be willing to bet a considerable sum that he could. It would have been necessary for him to continue to persist; and this for various reasons he did not do, success with Latin being less compelling than success as a speaker. But mere persistence, stupid persistence, would not have brought about the result. However—and here is the point—once success has begun to come, stupid persistence is no longer necessary or excusable. One has proved something. One has proved that the method one has adopted really works. One has revealed something—the reason why the method works. One has a chance to perceive something—the conditions, the essence, the inner feel of success. The will to learn has gained a finer, a more

precise focus. The darkness, the fog, has measurably cleared away. *One knows what to work for.*

The first successes that come in a process of learning are unique opportunities to carry that process further. Treat them in that way. You have made a sale; you have handled a personal contact well; you have put through a good and well-balanced executive decision; you have seen something new and fascinating in a picture; you have driven a golf ball two hundred yards down the fairway as straight as an arrow. Don't sit back with a sigh of relief and begin congratulating yourself. Go on learning. You have been granted a peep of the goal. The conditions of achievement have revealed themselves. Don't let them get away from you. Stop dead in your tracks. Close your eyes. Try to recall just what you did, just how you felt. Above all, try to remember just what you did *that was different*. A new creative synthesis has come. Do your best to capture it.

But if for a time it eludes you, don't be discouraged. Your very next sale may be bungled, your very next speech may be poor, your very next drive may be topped so badly that it rolls exactly ten yards. That also is in the natural course of events. But you have proved that you can do the trick. Keep on trying. Keep on experimenting. When the next success comes and fortune smiles again, learn a little more, grow a little surer, a little more intelligent about yourself and your job.

You see Gene Sarazen step up to the tee'd ball and smite it straight and far, and there seems not a tremor of doubt nor an atom of hesitation. You hear President Roosevelt make a speech, and he faces his audience and says what he has to say with the utmost assurance. You watch John Gielgud play Hamlet and every tone and gesture is controlled and perfectly in place. Here are successful performances. What makes them so easy, so certain, so perfectly grooved? *These men have learned how to handle themselves so that the conditions of success are certainly fulfilled.* Once they were learners. Once they fumbled, fooled, and failed. Once they did not know how to prepare themselves, how to set themselves, and there

was lost motion and ineptitude. But the will to learn established itself more and more certainly and intelligently. Success and failure came to be more and more sharply sundered in their minds. And at last the will achieved its ultimate goal. They captured and held firmly and securely the conditions of successful attainment. Their minds had become streamlined.

CHAPTER FOUR

SOME USEFUL HINTS

I

IN addition to the ideas I developed in the last chapter the research which has been done on learning yields a great many very valuable suggestions. All of them look towards the better organization of the will to learn, the more efficient handling of oneself on the job. To that extent the hints I am now about to offer are a continuation of what we have been discussing. But they carry the matter a great deal farther.

You will remember my saying that the thing to do whenever you have made up your mind to learn something is *to begin*. Also I said that this advice was likely to raise quite a number of questions in your mind and that it needed to be made more definite in various ways. Some of these questions I have tried to answer, but there is an extremely important one upon which I have not yet touched. On what should you begin, and where? You want to learn golf. Should you start right in trying to hit balls? Or should you practise holding your club, then practise the stance, then take the back swing, then the swing forward, then make a great many swings without any ball before you? You want to learn to draw. Should you commence by trying to make pictures of things and even people round about you, or work away for a while at lines and very simple combinations of lines? You want to become able to read, write, or speak Spanish. Should you put in much time grinding on grammar rules and memorizing

vocabulary lists, or tackle reading and perhaps speaking as soon as you can? You want to master a musical instrument. Should you devote patient pains to its technique for a long time, or undertake some pieces early in the process? You want to write fiction. Should you drill yourself on style, and then try observing characters, and then outline a lot of skeleton plots, and then do a good deal of pure descriptive writing? Or would it be better to work at complete stories from the first, or nearly so?

In short, just what does "beginning" mean? Does it mean making a frontal attack upon the new and coveted ability as a whole, or taking it to pieces and working separately at the different elements into which it can be analysed?

The general rule, to which there are some important exceptions and qualifications, seems to be: *Begin with the skill as a whole.* The very best of all ways to learn Spanish is to spend a few months in Spain or Latin America shunning all contacts with people who speak English. For the first sixty days you will nearly die; but, far sooner than you might expect, the gibberish sounds about you will become endued with meaning and you will find yourself conversing—yes, and thinking—in the new medium. I know people who have taught themselves to read French almost as well as they read English simply by starting in with French newspapers and books, picking up what they needed from dictionaries and grammars as they went along. There is an art teacher in Boston much of whose work is with adults who have never drawn a thing since they became dissatisfied with their efforts as little children and gave up. The essence of his method is having his pupils look at objects carefully and then try to get them on paper, outlining them in bold, free, continuous movements. And he insists almost with violence that they must not niggle and fuss and stop to correct errors. Our best modern music-teachers set to work in the same way. They do not go on the principle of having a person acquire technique first; they begin immediately with pieces, and they help the learner to fumble through them and pick up technique in the process. Twenty years ago children were taught to read English by

first learning the letters, then combining them into words, and then again combining them into sentences. To-day teachers start with words, get to sentences almost at once, and may actually neglect to teach the alphabet. And it works. Children learn to read much faster than they used to do. There is no doubt that in the case of most of the jobs of learning you might wish to undertake you would waste your time and compromise your chances of success if you tried first to master each separate constituent element and then to put them together. I know a woman who spent most of one winter most diligently practising every phase and detail of the golf swing without any ball. But when she went out on the links in the spring she had to learn all over again. She gained, perhaps not quite nothing for her pains, but certainly far less than she had a right to expect as a return for the time and effort invested.

But there are a few exceptions. If what you are tackling is very new, very strange, very different from anything you have done before, then you must work at it piecemeal. One of the best instances is acquiring the Morse Code on the telegraph machine. You must master the separate letters before you can deal with words—and it takes a long time to do so. You must master the words one by one before you can deal with phrases. The experiment proving this point was performed many years ago, and the investigators thought that they had established a general rule—always master everything bit by bit, element by element, and then combine the parts to form the whole. But they had not. They were dealing with an extreme and exceptional instance, a skill of a very special and unusual character. Typewriting, for example, seems to be a sort of half-way house. To be sure, you should learn thoroughly the geography of the keyboard, and drill yourself on the separate letters before pushing on to words and phrases. But this stage is far shorter and easier than what is called the “letter stage” with the Morse Code. And attempts at words and phrases should come much sooner. And in most learning these definite stages—letters, words, and phrases—do not appear at all, and should not control what you do.

So much for the exceptions to our principle. Now for the great qualification. You must not confine yourself entirely to doing the new job as a whole. You must take it to pieces and work at it part by part. *But analyse as you go, not before you start.*

Start your golf with five minutes' fooling to get the feel of the club, then hit a few balls, then stop and rehearse a few back swings, then hit a few more balls, then try over the stance or the knee action. Make the whole of your learning a process of putting the thing together as a whole, taking it to pieces, and putting it together again. Start your Spanish by actually reading a page of the easiest stuff you can lay your hands on, hunting up what you need in the grammar and the dictionary. Then note some of the words you have had to look up several times, list them and learn them. Read another page; then stop and memorize some of the grammar. Don't try to swallow vocabulary and grammar *in toto*. But do take care to assimilate them as helps to better and better reading.

Begin your public speaking by making a speech, no matter how stumbling. Then think over what you have done. Try to locate a few outstanding weaknesses. (Don't try to locate or deal with all of them.) And set to work to clear those up before your next effort. To become a good salesman try first of all to make a sale. Then select some one point on which you find you need to build yourself up and work on that. After your next sale select another such point. And so on.

Any expert and highly developed skill is like a perfectly streamlined machine, with all resistances, all parasite drag eliminated. But, unlike a machine, it cannot be put together from blue-prints. It must grow into shape, and it must grow all over. We cannot make each separate part and then fit it perfectly into place. Our entire piece of mental machinery exists first of all in the rough, with many crudenesses, many excrescences, many points of resistance. It works awkwardly at first, and requires an excess of energy. We stop it, and take out one obviously ill-adjusted part and fix it up. Then the thing seems to go a little better, but something else now causes trouble, so we correct that, and little by little everything comes

into line. Of course, as our machine approaches the perfection of streamlined efficiency more and more closely, our recognition of small faults becomes more and more accurate and our adjustments finer and finer. *And the moment this process of continuous readjustment and re-shaping stops, learning stops also.*

II

How long at a stretch, and how often during a day, should one work at a new skill in order to acquire it as quickly and as well as possible? A great deal of research has been devoted to this point, but strange to say no very satisfactory or definite answer has been found. One cannot say that a person should work for fifteen minutes six times a day, or for half an hour four times a day, or indeed give any specific advice in terms of minutes of practice and numbers of practice periods. And yet, after all, this is not so strange. Learning is a very complex affair. It is an art, not a routine. And the length of time you give to the job must depend on many unpredictable matters—the kind of job you are doing, the kind of person you are, the other things you have on hand, the stage that the learning has reached, and your own feelings. But the moment we take this point of view and stop asking just how many minutes it would be best to spend on an undertaking—when we think of learning as an art requiring the use of inventive intelligence and the organization of the will—the research materials become very helpful. Here are some points which are pretty well established and practically useful.

1. In the early stages of learning, when the new skill is just in process of being created out of chaotic clumsiness, work only for short periods and space those periods widely. "But," you say, "this is very vague advice. How short is a 'short period'? And how far apart is spacing them 'widely'?" Once more I repeat that one cannot tell you in hours and minutes. But this does not mean that there is no good clue. You can plan and distribute your practice intelligently enough if you will always think of *what you want it to do to you*. What you are trying to make happen inside your mind, not the

movement of the clock hands—here is the true determining factor.

In the early stages of learning you are trying to feel out the new skill. You are trying to fumble your way to success, and then to identify the conditions of success. How does it feel to organize a story properly ; to handle a sales contact well ; to make a good service at tennis ; to play a bridge hand judiciously ; to deliver a speech effectively ? These are the things you are trying to find out. And so one might say that quantity of practice is far less important than quality. Indeed, as I have said, you are concerned not so much with practice in the ordinary sense as with experimentation. (Owing to the exigencies of language it is almost impossible to avoid using the *word* "practice," but this does not matter so long as the idea of what is meant is clear.) Now if you spend a great deal of time continuously on the job you are almost certain to relapse into routine. The poem you are memorizing will begin to lose interest and charm and even meaning. Your motor reactions will become cramped and prematurely grooved. One sales interview will repeat the blunders of the last. You will not have time to recover from mistakes, and errors may become set. Your own zeal may defeat its own ends.

So do not count it laziness to choose rather brief and sparing arrangements of practice. Do not say to yourself : "I'm going to stick to this job until I've mastered it." Desperation of that sort may be noble, but it is not wise. It may quite probably be that at the end of half-an-hour's practice you will feel that you have learned absolutely nothing. Do not be too much discouraged. The learning process is not like building a wall ; it is like inventing a machine. And you cannot always see the work progressing. You have to discover what changes are needed to improve the streamlining. Considerable exploration may yield nothing tangible, yet it may not be a waste of time. Quite suddenly you may hit on a vital point.

On the other hand, do not make practice periods too short. Take long enough to read your poem through thoughtfully and appreciatively two or three times ; or to get your mind

well wrapped around your mathematical problem, whether you solve it or not ; or to rehearse your physical skill from a fairly wide variety of approaches. If you are delivering a speech or trying to make a sale the length of practice will take care of itself, because then you must go through with the job to the very end, be that end bitter or sweet. And here we have a good object-lesson for the management of all practice. Your aim is to catch the feeling of the job, and you must take time enough for this to be possible.

2. One important reason for spacing practice quite widely is that learning can take place when you are not practising. Notice I say that it *can*, not that it always does. In fact what usually happens when you stop work is that you proceed to forget. But this is not always the case. In one of the most remarkable experiments ever performed it was found that large numbers of people could actually remember poems and prose selections better four days after they had learned them than immediately afterwards. Also it has been found that people will remember tasks and problems that they have not completed better than those which they have completed.

Here we have an intelligible clue to what at first sight seems a riddle contradicting our ordinary experience. If we learn or partly learn something, and then simply give it up, we lose it—though even then the loss is not always so complete as we suppose. But if when we practise a skill we know that we are coming back to it again, then our whole subconscious attitude changes. Our minds continue to play with it, even without our being wholly aware of what is happening. Suppose that you are learning to speak in public, and that you have made a talk to-day, and that it has not gone very well. A week from to-day you are to make another. We might say that the idea of public speaking is working deep down in your mind below the level of consciousness. Perhaps something you read in the paper or hear said connects with a difficulty you experienced. The connection may be very obscure and indirect. At the moment you may not even be aware of it. But when you rise to your feet a week from to-day you find that something has taken place, and that a

part of your trouble has cleared away. This effect of recess upon the learning process explains why a person may partly memorize something late at night and find that he remembers it perfectly when he wakes up in the morning, and why a golf player or a musician may come back from a vacation and discover that he has mysteriously improved. A reorganization has taken place. A better and finer shape has emerged.

But you need not rely on the uncontrollable subconscious in order to reap benefits from recess. You yourself can do something about it. While you are taking a walk or sitting in a tram-car or driving from one town to another you can *think about* the skill for which you are striving. Thinking between practice is one of the most valuable means of learning. For you are free and untrammelled, and new and better modes of approach may suggest themselves most readily at such times.

3. The rhythm and distribution of practice should be changed as the skill moves towards its final perfection. The very skilful person can crowd himself and work hard and for long hours. Indeed, intensive work under pressure may be valuable in the later stages of learning. Why this should be so is clear enough from the account I have given of the nature of the process. Let us return to our metaphor of the construction of a machine. At first it will hardly go at all. Little by little we adjust and perfect its various parts, and at last it really begins to achieve our purposes. But still it is not pinned together or shored up very firmly. If we put any serious pressure upon it before this point, it will break down, just like a car which is driven too hard when brand new. Now a dead machine, a car, will never be improved by driving it to the limit at any time. But our machine is a living one—a mental machine. And towards the end it may be actually beneficial to put stress upon it. To do so may harden everything up, and press the organization into place.

So towards the end of a job of learning repeat often, repeat hard. Try for distance. Try for speed. Create handicaps. Put yourself in situations where there is plenty of distraction and circumstances unpropitious for success. Begin the poem

in the middle. Have someone read aloud while you try to recite. Hurry to your speaking engagement. Try for an extra twenty yards on your drive. Experimentation is still going on, but it is on a new level. The feeling of success has come. Now it must be confirmed and set and crystallized.

III

One of the most fruitful and illuminating ideas developed by psychological research is that learning is *a process of transformation*. Any skill, as it advances from clumsiness to perfection, becomes radically altered. The expert differs from the novice, not in doing the same things better and faster and more accurately, but in doing them differently. The streamlined car may have no more power, yet it not only goes faster but also behaves differently on the road from the old, clumsy model. So learning does not mean an actual increase in power so much as the better use and distribution of that power. And essentially the change consists in introducing new and more effective modes of control. Here is a point well worth understanding. Let us consider a few illustrations.

A little pupil once put this question to his music teacher: "How do you read a hymn tune so fast? I can't understand how you have time to figure out each of the four notes in every chord you have to play." This strikes at the very root of the matter I want to convey. In order to play a chord the pupil had to look at each of its notes separately. But the teacher was able to see the chord as a whole—indeed, to see several chords as a whole—and grasp the general pattern. There you see the shift from a poor to a better control. Improvement did not consist in looking at each note faster, but in looking at something quite different and new. Again, Theodore Roosevelt could read English three or four times as fast as the ordinary person. But he did not look at each separate word three or four times as quickly. He caught more words *en masse* at a glance; he took bigger gulps with his eyes. Indeed, the reason why you can read so much faster than a child in a junior class is that you are able to see more

at one glance. (It is not mere seeing ; you infer far more from what actually meets your eyes.) So again, progress in reading, from the junior class level to that of Theodore Roosevelt, is not a matter of looking at single words faster and faster, but of lumping them together in bigger and bigger masses—in short, a transformation of control. Or again, watch an expert public speaker, and see how he uses his notes. He has a great deal written out, and follows it quite closely. But when this same speaker has become expert he will have far fewer notes—perhaps only a few headings and cues jotted down to keep him on the track ; and he relies upon them, and controls himself by them far less. In the same way all great skill of every kind—playing a game, handling an interview, performing a piece of music, memorizing or acting a part in a drama, recalling the names of those to whom you have been introduced only once—invariably means the establishment and use of highly efficient and economical controls. It is not the performance of the novice raised to the n th power ; it is a changed performance.

The idea is not particularly recondite. You can find innumerable illustrations of it from daily experience. But its consequences are quite momentous. It explains a host of things, and gives one many angles for self-direction.

1. It explains at once why accuracy and speed of performance always tend to go together. Investigation has shown again and again that the rapid worker tends to be the accurate worker. The fast reader remembers more. The fast typist makes fewer errors. The quick problem-solver is more likely to get the desired result. And the reason simply is that both accuracy and speed depend on the same thing—perfectly organized control. The streamlined car not only goes faster and more easily ; it also steers better. If we try to push our speed beyond the limits of our achieved control, then we begin to make many mistakes. But also it is true that if in our desire to be accurate we pull our speed below the normal level our control permits, we defeat ourselves and again fall into errors. We have the feeling of “ over-anxiety ” which is due to sacrificing the organization which our learning

has achieved. Your best chance to avoid numerous inaccuracies on the tennis court, at the typewriter, in reading and trying to understand a new and difficult book, in solving mathematical problems, and indeed everywhere, is neither to force yourself nor deliberately to "take it easy." If your achieved controls are stable and well organized your action will be vigorous and swift and your mistakes reduced to a minimum. And the way to improve both speed and accuracy is to transform the skill to a higher level.

2. It is this transforming process, this emergence of better and better controls, that accounts for the ease, the assurance, the poise of the expert, and even for his resistance to fatigue. A few years ago a metabolism test was given to a group of athletes and a group of non-athletes while they pedalled on a bicycle crank against the drag of a brake. The athletes were not much stronger physically than the non-athletes, but they tired much more slowly. And here was the reason. At the beginning both groups were putting forth an amount of bodily energy which might be indicated by the figure 10—the metabolism test, of course, showing how much energy their bodies were generating. After five minutes the non-athletes were burning up 17 units of energy and the athletes only 12; after ten minutes the non-athletes were burning up 30 units and the athletes but 18.¹ In order to keep going the non-athletes had to switch in more and more muscles; they had to "work all over" to continue turning the crank; and they became exhausted as their efforts increased. The athletes, on the contrary, were able to keep the performance "grooved" and limited far longer. Not superior strength but superior skill saved them from rapid exhaustion.

This is the reason why a human being can stand the enormous vocal stress and strain of singing a leading part in a Wagnerian opera without killing himself, as a novice who attempted it might very well do. It is also the reason why an inexpert learner who tries the dangerous trick of a last-minute cram for an examination or a speech becomes befuddled and confused and exhausted. The swift, smooth preparation

¹ The figures are hypothetical and for illustration only.

and calm and impressive assurance of the accomplished public performer or negotiator are by no means merely a matter of temperament. Or, if so, they are a matter of *acquired* temperament. They are an expression of his skill. No matter how hard the novice may try, he cannot do as well. One of the most distinctive marks of all supreme accomplishment is its ease, and the secret of that ease is the efficiently organized underlying control. It is precisely the difference between the streamlined and the non-streamlined mechanism.

3. Just because learning is essentially a matter of transformation it is true that you can always improve your standards of performance in almost anything you do. Your present level of ability is always due to the way you co-ordinate on the job, to your method of attacking it and handling yourself. If you wish to do better, you must find a more efficient method. You must bring to bear the will to learn. You must determine to discover a way to improve. If a person is very expert indeed—if he is a world's record performer—this is a difficult problem; for he is already using the best-known method and must invent one that is brand new and more efficient. And yet we know that even world's records can be raised. For the ordinary person the job of bettering his standards is relatively easy, for he is almost certainly not using the best extant methods; and all he needs to do is to find out what they are by hiring a coach or reading a book, and then set to work to apply them.

4. Every learner, every worker, has the discouraging experience of encountering what are known as "plateaus"—dreary expanses of time when improvement refuses to arrive. A plateau in learning may have a number of causes; but by far the most common is a breakdown of the will to learn. Perhaps the will simply evaporates. One tells oneself that one is doing well enough. This is the surest of all ways not to do better. But perhaps one tries and wrestles and sweats and still sticks on and on at the same dead level. Why is this? It is because the will to learn, although present, is not organizing itself properly. The new method, which it is imperative to find, and which it is one's most essential purpose to find, remains hidden. What then should one do?

Above all, do not stop experimenting and take to hammering. The temptation to do so will be strong. But these moments of difficulty are, above all, the times when intelligent control is most urgently required. When a machine will not shape up to your liking you are always apt to get irritated and hit it a crack or two. But you may only succeed in ruining it. Analyse your problem and do your best to diagnose your difficulty. Try every varied approach and every trick of self-direction you can conjure up. Try elaborate planning and careful preparation; then try rushing into action with no preparation at all. Work with terrific concentration; then work with a thoroughly "don't care" attitude. Work very fast; then work very slowly. Work late at night; then work early in the morning.

Perhaps you read Ellsworth's book, *On the Bottom*, the story of the salvaging of a sunken submarine. If so you recall how the submarine was embedded in the mud of the ocean floor far below the surface, and how it presented a problem never before undertaken. The salvagers tried expedient after expedient, only to be rewarded with failure. But at last courage, persistence, and intelligence were rewarded, and they raised the vessel and towed it safely to the Brooklyn Navy Yard. When you are on a learning plateau you are like the submarine stuck in the mud. Mere pounding, mere "stick-to-it-iveness" will not get you loose, unless by chance. You need to apply a combination of qualities, each of which is necessary. It is the same combination that the salvagers used: Courage, persistence, intelligence.

CHAPTER FIVE

CONSOLIDATING GAINS

WE learn things for the sake of remembering them, do we not?
"Yes, indeed," you reply; "that's obvious and hardly needs saying." Very well then, try yourself out with these questions.

Who was President of the United States during the war with Mexico? What was the approximate date of the Hegira? And what was the Hegira? How do you define an ohm? An erg? An ampere? A watt? What was the historical significance of the Church Council of Nicæa? Of the Peloponnesian War? What are two substances used in making hydrogen? What is the velocity of light? Of sound? Has sound the same velocity in a steel rod and in the atmosphere?

If you had a secondary school education you almost certainly learned all or nearly all the answers to these questions once upon a time. They are taken from a test that was given to college seniors in America to find out how much they retained of knowledge once acquired. And a ridiculously small percentage could reply. How do you score on this test? If you do not know these things, what was the use of ever learning them? This last query is very searching and cuts deep down to the heart of the efficiency and value of all learning. Learning points towards the future. It has a purely prospective value, and that value exists only so long as its results are retained. So we come immediately to the topic of the present chapter. We have seen how to learn, how to make gains. Now we must ask how to consolidate those gains.

Consider again the sample questions I have listed. The students to whom the test was given knew all the items at one time. But a few years later they had forgotten them. Why? There is a reason which leaps at once into one's mind. They had learned these things for the sake of reproducing them in an examination at the end of a course. All their work was organized towards this end, and the moment it was achieved they began very swiftly to forget. Their purpose was not to retain this information permanently. The entire action and behaviour of their minds were controlled by a certain goal. So we encounter once again the will to learn as the secret of efficiency. *The retention of what we learn depends primarily upon our purpose in learning it.*

You will remember the instance I gave in an earlier chapter

of how the mere determination to remember something for a long time causes one to retain it better and longer. So here we can state a practical rule. Whenever you learn anything, always have in mind the future occasion when you will want to use it. Perhaps that occasion will be quite definite and not so very far ahead. With a student in a course the concentration may be upon an examination coming at a definite time. On this his processes focus. Everything is organized with respect to it; and afterwards the material disintegrates and sinks swiftly out of sight. One cannot blame him for this; it is a learning pattern imposed upon him by the system of education itself, and he wishes quite properly to be as efficient as he can. Possibly, too, he is wise, for much of what he crams for a test may not be worth keeping! Or again, the occasion may be a speech that you are to make next week; or an important conference for which you must assemble information; or a brief that you have to prepare. Whenever material is to be on hand at a definite time, keep that time in mind as you learn. This is one of the prime secrets of efficiency. It enables one to learn quickly and surely and with minimum effort. It ensures that one will have what one needs when one needs it. You will probably forget quite quickly after the ordeal is over. But this need not matter much—indeed, it may even be good business.

And if you want to learn for long-time retention have that in mind too. I believe that some of the most conspicuous and striking cases where we apply this principle almost unconsciously are to be found in the acquisition of various physical skills. When a person learns to dance, or to swim, or to shoot, he usually goes at the affair in a very different way from cramming for a test. It may be, of course, that he has invited a young lady to a dancing party three weeks off and has never danced a step in his life. But this is quite an unusual situation; and even then he probably looks forward to a succession of delightful occasions in the indefinite future. Ordinarily we take up dancing, or swimming, or shooting, or horseback riding, or tennis, or golf as permanent accomplishments. And the idea of permanent retention, which seems

so obvious that we hardly need to state it to ourselves, actually controls us and determines the outcome. I think this is one reason why a person who has learned to swim need not be afraid that, if he is tipped out of a canoe even after a year away from deep water, he will have forgotten how.

When it comes to remembering information, however, a conscious and deliberate will towards permanent retention is much more necessary. If you wish to keep in mind for future reference the qualifications of an employee, or the address of an acquaintance, or the financial situation of a firm, or the detail of a conversation, or the points made by a speaker, the very first and most essential step is simply to determine to do so. Of course there is a great deal of floating and ephemeral information for which we have a temporary use and with which it is not advisable to burden the mind. For many purposes a note-book is superior, because paper is cheaper than mind-stuff. On the other hand, there are certain things which it may be very desirable indeed to retain permanently. Instances are the spelling of certain words, poems one has enjoyed and would like to con over by oneself, foreign language vocabularies, people's names, and so forth. Always the will towards permanency is a causal and helpful factor. In any case, short-term and long-term retention are two very different processes, and you should govern yourself with this in mind. I am sure that one reason why we so easily dissipate our gains in learning is that we do not work with a conscious eye and a conscious will towards the future use of what we are acquiring.

II

Yet another important reason why our students made such a poor showing on their memory test is that their learning was done in a narrow compartment. Everyone who has been to school knows that this is so. Here is a pupil in a course in elementary physics. He is given a lesson in which he has to learn the meaning of the words ohm, ampere, watt, and erg. He goes home, studies diligently for an hour, feels justifiably certain that he has mastered the job, slams his books and

strolls out to a cinema. Nothing in his ordinary living connects with his new knowledge. Next day he recites creditably enough, and then once more puts it all out of his mind. Before the final examination he reviews the material once or twice, but always in the same narrow, business-like, strictly limited way. His physics is just something that he hammers into his head out of a book, and the instant the hammering is done he turns away from it with a sigh of relief and a sense of accomplishment. This narrowness, this isolation of the material from anything else in the world, is a very definite reason why it is soon forgotten.

So if you wish to retain anything permanently do not learn it in a sort of water-tight compartment. On the contrary, bring it into touch with as many interests and activities as you can. Then the ordinary flow of your experiences will serve as continual reminders. You may not be aware that you are being reminded. You will not have at all the sense of the ordinary mechanical and more or less boring review. But the influence will be there just the same and will help you greatly. This is indubitably the chief reason why, as investigations have shown, the subject best retained of all those taught in school is national history. The material the pupil gathers from his textbook makes all sorts of connections with his daily life—with what he reads in the newspapers, and sees on the screen, and hears discussed at the dinner-table, and with the places he visits. All these experiences serve as a stream of reminders which keep the content of his history fresh and operative in his mind. Here is a clue well worth following in the management of all learning. Let us see how we may do so.

1. Consciously try to form associations between the new thing you are learning and your daily life. Perhaps you have difficulty in remembering the names of persons to whom you are introduced. Well, next time you meet a stranger, try this: As soon as possible after being introduced find a little time by yourself, and then rehearse with that person an imaginary scene, discussing some matter of interest, telling him about some problem, and using his name while also

imagining his responses. Or, if you can, carry on such a conversation with him in reality. By such means the introduction becomes far more than a piece of transient and formal politeness, which is the reason why it usually makes such a transient impression. It becomes a real *introduction* of this new personality into your own interests and plans. Or again, you read a book whose main ideas you wish to remember as permanently as possible. Do not just try to swallow it like a student cramming for a test. That is not the way. Think out the practical bearing upon your own affairs and prejudices and interests of what the author has to say. You may not be able to recite the exact sequence of his listed points, but his argument or presentation will have become a part of you. And a year or five years later, when you have something to discuss or some plan to work out, to which his exposition is relevant, the needed material is available to you. It has been said that the best way to remember for ever a story or a joke that one has been told is to tell it to the first three people one meets. Now, three *repetitions* would not have any very tremendous effect. But when you have to pick your moment, and mould the story to the occasion, and watch its effect, it becomes integrated with a variety of interesting social experiences, and tends to pass into your permanent stock-in-trade. In the same way, if you read a poem which pleases you so much that you would like to remember it for ever, do not rely merely on repeating it a few times until you can say it by heart. Say it to somebody else. Say it to a number of people. If you are going to make a speech, work it in somehow. Then a year later when you are driving alone in your car or in the midst of another speech you will find yourself beginning it and going easily through it without any nervousness about forgetting, just as you would confidently begin to swim if you were suddenly tipped out of a canoe.

2. Do not hurry the learning process. Learning is far less a matter of grinding than of maturing. And maturing takes time. Here is an added reason for the wide spacing of practice, more particularly in its early stages. In the intervals one's mind has a chance to play with the material, to see it

from many points of view, to assimilate it to one's general experience and interests. The last-minute cram is bad, among other reasons, because it forces us to learn so narrowly. All sorts of interesting and valuable implications are lost ; fine shades of meaning are not noticed. The delicate roots and tendrils which bind the new material firmly and permanently to the soil of the mind are not put out. Everything is forced, and the whole growth is superficial and weak.

Of course the act of practice should always be as intense as one can make it. During practice one should concentrate to a maximum. But, for the sake of permanence, learning needs an element of diffuseness as well as of concentration.

3. Very closely connected with this is another and more specific point which you may find valuable. Suppose one wants to master some piece of intellectual content, be it an argument or an analysis or an array of facts, is it best to study the briefest and most compact statement one can find, or to read widely? If what one wants is to get the stuff fairly well for short-time retention, then the brief statement will be the most valuable. This is particularly true if one's purpose is limited to a mechanical recitation. But if what one wants is long-time retention, then the more diffuse presentation will be better.

The reason is obvious enough. When an author has to write up a body of material as concisely as possible he must limit himself to naked statements. He must not wander along alluring by-paths or follow up interesting ramifications. Everything must be compressed into as few words as possible. And so all the suggestions, all the implications, all the applications which would serve to root the material in the reader's mind, are cut out. A summary of a book may contain all the essential points of that book, but it will not give you the same adequate and significant impression of the author's meaning. So, merely for the sake of permanency of retention, *extensive* reading is better than *intensive* reading. And this has been well demonstrated by research.

Moreover, if you want to do more than merely remember what you have acquired from your reading—if you want to

be able to use it freely, flexibly, confidently—the advantage of the extensive method is still more evident. If you are gathering material for a speech, or trying to grasp the principles and techniques of salesmanship, or seeking to understand a complicated argument, read as widely as possible. The point is not that you will pick up more angles, more ideas—although of course this may happen. Perhaps the gist of what you read about how to sell, after you have covered three books on the subject, could be boiled down to five thousand words. But you will get more, you will remember it better, and you will be able to use it more effectively, if you read the three volumes than if you had someone prepare a five-thousand-word digest and studied only that.

III

So far I have been talking as though the only problem in consolidating the gains of learning is to prevent or postpone loss. But there is another kind of difficulty which, because it is more complex, is harder to meet. Forgetting is not merely having ideas, facts, names, and skills of mind and body fade away. Our minds trick us more subtly and disastrously than merely by letting go what we want them to hold. They behave like malicious conjurors, cheating us into the belief that we know something when really we do not.

Forgetting can mean not mere loss, but also *recombining*. Two different persons give us two items of information, and a month later we would be willing to swear that they were both told us by the same individual or even that we read them in a book. We have a business interview in London, another in Bristol, and then go to Bradford; and in a week or two we are persuaded that both our talks happened there. We are like the student who had learned something about the Greeks and something about the Turks, and then was quite sure that the battle of Marathon was between the Greeks and the Turks, whereas it really took place a thousand years or so before there were any Turks.

Also forgetting can mean *over-simplification*. We are given

a set of instructions, and a week later feel sure that we remember them perfectly. So we do—in a general way. But when we come to apply them we find that we cannot remember an absolutely essential detail. I know a college freshman who was just starting Latin. It was his first attempt with any foreign language, and so he had no idea how it ought to be studied and no experience to guide him. The instructor assigned the first declension and the student worked at it faithfully. Next day in class he knew absolutely nothing about it. When the instructor expressed surprise and asked how the disaster could have happened in spite of the effort, the reply was : “ Oh, I just read it over several times and got the general idea.” The absolutely necessary detail had escaped the learner’s attention.

Again, forgetting can mean *elaboration*. A person can make up something which never took place at all, do so quite innocently, and then be quite sure that it happened. As events drop out of our minds we tend to invent others to take their place. Cast your mind back to some year-old experience. Can you be sure—*sure*, please notice—of discriminating fact from fancy? And, even if you are sure, still you may not be right, for a person’s confidence is no guarantee that he is correct unless he has rigidly checked up on himself in some manner. This, of course, is why witnesses in court are so liable to error. They remember in a sense. But they are almost sure to do a good deal of recombining and oversimplifying and elaborating as well as forgetting in the more ordinary sense. Four observers of the same road accident will tell four stories all more or less inconsistent. Not only will they be unable to tell all that happened ; they will also be able to tell a good deal that never happened ! So vague are the boundaries between memory and imagination.

Every psychologist, every criminologist, every psychiatrist, every stage manager and prompter, every good teacher—everyone who has to deal with learning as an expert in a practical way—knows that such things are possible. And we should be clearly aware of them if we are to handle ourselves efficiently. It is not enough to learn things. It is not even

enough to learn them so that they will stick. It is necessary to learn them so that we can retain and use them as they really are. Imagine a business house whose filing system consisted merely of throwing all papers and records into cartons and storing them in the basement. Everything would be there. Everything would be kept. But nothing would be useful. Nothing could be found when it was wanted, and the right things would be in the wrong places. Now, the filing system of the mind is more subtle and evasive than any devised by man. It is a living filing system, and seems inclined to play tricks whenever it is able. It will shift records from one file to another. It will keep part of a document and throw away the rest. It will secretly write a carbon copy anew. And it will invent whole letters that you never stored at all. How can you make the thing behave? *Can* you make it behave? What should you do?

Here as always your best and surest reliance is upon the will to learn. And here as always the will must be intelligently organized. Let me offer a few concrete suggestions.

1. During the process of learning make a definite effort to get things straight. And translate your effort into a programme for handling yourself. Do not be merely receptive. Be analytic. Be thoughtful. Be responsive in the sense of reacting strongly and copiously. If you are receiving verbal instructions do not be passive. Ask questions. Raise points. Comment. If possible suggest criticisms, not for the sake of being critical but for the sake of understanding more perfectly. Do these things even though you think you fully grasp what you are being told. If the instructions are in writing, do not be content with merely reading them through. Give yourself a "quiz" on them, and do not make it nothing but a memory "quiz." Ask yourself what would happen if you did thus and so which you were told not to do, or what would happen if conditions turn out to be other than those which the person who gave the instructions contemplated. If you are making an appointment to do something on a certain day, and cannot jot it down, do not merely say to yourself: "I must meet so-and-so at noon on Thursday," and rehearse the words a

few times. Think over your plans for Thursday and consider how you must modify them in view of the fixed date. Imagine the meeting, its place, its circumstances, and the conversation likely to ensue. If you meet a stranger and want to remember his name, do not look hard at him and say over to yourself, "Robinson, Robinson, Robinson." Or do not confine yourself to this. If you do you are relying on repetition, which, as we have seen, is not the prime cause of learning. The result may be that next time you meet him you may call him Robertson or forget his name entirely. As soon as you can, write his name down and look at it, and write down also a few jottings about his appearance or special characteristics. The reason why this will help is not, as some psychologists might suggest, that you get his name through new sense avenues. What helps is not the mere adding of impressions. No—writing down and looking at the new name forces you to get it straight. And, if you can draw a little, a thumbnail sketch will fix everything still better. If you are trying to learn a poem, or a string of factual happenings, or a sequence of arguments, do not rely on mere impression. Do not stop until you understand how everything connects together, and why one line or fact or idea or argument comes before another and after yet another. If you are preparing a speech do not try chiefly to memorize its outline. Have a good reason for taking things up in a certain order and be perfectly clear on what that reason is ; and then when you rise to speak your points will come out of your mouth in that order.

In short, never regard any sequence of learning as adequately completed until you are sure everything is clear, orderly, and perspicuous. The reason why witnesses report road accidents so badly is that in the very nature of the case they are confused. The will to learn cannot organize itself in the face of unexpected disaster. The initial impression is fogged. And immediately the mind goes to work and invents an imaginary picture.

2. Then remember that rehearsal and application are parts of learning. And they are very different from repetition and should be differently handled. Make them as varied, as imaginative, as creative as possible. You want to make a

speech or present an argument as clearly as you can. Then do not hammer through it again and again in a stereotyped form. Go over it in many different forms, starting from different points, moulding it in different ways. When you come to deliver it you may not follow any one of the forms you have rehearsed. But it will be *clear*, it will convey the essence of what you have in mind. If you are given a set of instructions, reformulate them to meet varied conditions. Imagine yourself suddenly confronted with the problem towards which they are directed, and then imaginatively rehearse their application in full detail. When you are walking home after having been introduced to Mr. Robinson, look at a telegraph pole and murmur to it "How do you do, Mr. Robinson," and imagine its look of pleasure at your recalling its name so well. Do not try to learn a rule by merely memorizing it. *You have never learned a rule until you have tried out some applications, and considered its congruence or incongruence with other and related rules.* In the same way you have never understood an argument until you have apprehended its consequences and considered the difficulties against it and the exceptions to it. And you have never learned a fact until you have brought it into relationship with other facts and seen how it fits into the texture of your total experience.

These are a few suggestions which you may find helpful. Try to add to them. All in all they should show you what it means to organize the will to learn in such a way as to defeat the natural tendency of your mind towards recombination, over-simplification, and elaboration. You must organize it as a *will to learn clearly*.

IV

Before leaving this topic of the consolidation of the gains of learning there are a few more scattered but not unimportant comments to be made.

We all know that memory is treacherous. One may have learned a thing very thoroughly, and yet forget it at a crucial moment, like the actor who goes through a part a hundred

times and then dries up in a speech on the hundred-and-first. Is there any way of defeating this tendency? No, there is no sure method, because such slips of memory are brought about by something extremely elusive—namely, our mental attitude. If you hypnotize a person—something that can be done quite easily in many cases—you can make him temporarily forget anything you want. You can make him forget where he parked his car, or the name of the firm that employs him, or his address, or even his own name. You do it by simply telling him that he will forget. And, when you ask him any of these things, sure enough his mind is a blank. Now, such slips of memory in everyday life are due to a sort of self-hypnosis. The hypnotist creates artificially and deliberately an attitude which shuts off the material from consciousness, and the very same thing happens when our memory temporarily fails us on more ordinary occasions. Now, the most prevalent cause of such destructive and unfortunate self-hypnosis is *undue anxiety about remembering*. So the practical advice would be: Once you have learned anything—once you are sure you have learned it—don't bother about being able to get it back when you need it. The natural course of events is for it to arrive easily and unconsciously on call. Anxiety tends to disrupt this sequence.

Then as to the use of mnemonic devices. These are jingles and combinations of more or less meaningless words to help memory, like the one for the number of days in the months. Commercial memory systems are often schemes of such devices. Now, they have their uses, but these are very limited. In any case do not pay your good money for them. You can invent them for yourself and adapt them to your needs. But do not make much of them or place much reliance on them. They are dangerous and may defeat the very end for which they are devised. For, after all, any jingle or mnemonic device is *just one thing more to learn*. I know of a student who once carried this trick scheme to the limit. He developed a key word which was supposed to remind him of the content of each paragraph of all the books he had to study. Then he combined them and got a key word for each chapter.

Then he combined them still further and got a key jingle for each book. Then on the examination day he confused them all, and could not recall which jingle applied to which book! How much better if he had treated himself like a reasoning and thinking being, and mastered the stuff directly. As a matter of fact any memory system is bound to be dangerous and of limited utility. You cannot become a good runner by using crutches. You cannot become a good learner by using mechanical tricks. You can do so only by the intelligent organization of the will to learn.

Lastly, do not rely much on what is called "over-learning." By this I mean interminable repetitions beyond the point of mastery. Of course you will not be content with only just learning anything. You will not feel that you have mastered golf as soon as you make one or two good shots, or that you adequately know a poem the first time you can go through it, or that you can write short stories as soon as you have produced a single passable sample. But mere repetitive pounding does not help much. This is very obviously implied in all that I have said. Yet in your anxiety to consolidate a gain, to be sure that you will remember, you may still resort to it. Resist the temptation. The consolidation of your gains depends on learning with a purpose permanently to retain, on learning with a will to associate the new with the familiar, and on learning with a purpose to see and understand clearly. It depends on the intelligent organization of the will.

CHAPTER SIX

USING WHAT YOU'VE GOT

I

THE discussion of the last chapter calls for a sequel. Many of the explicit statements made in it, and still more its implications, demand that we carry the argument a step further. We have seen how to set about consolidating gains and retaining permanently what one has learned. But one does not learn

things merely for the sake of *keeping* them. One learns them for the sake of using them. And this is also a very vital and often a very elusive problem which we must now consider. How much of a problem it is I can show you by two anecdotes.

A professor's family were confronted with the necessity for re-roofing their country home. They planned to order the material from the makers and do the work themselves; and of course they needed to find out how much roofing was required. Here they struck a snag. They had no ladder long enough to reach the ridge pole, and the roof was too steep to climb. How then could they measure it? For several days they were completely stumped. Then came a visitor with seeing eyes and understanding mind. He noticed that the roof formed a right angle at the peak and that the two sides were equal in length. An isosceles right-angled triangle with the base line of known length! Had nobody ever been told that the sum of the squares on the two sides of such a triangle was equal to the square of the hypotenuse? And couldn't anyone do a little arithmetic? How very simple! One could easily figure the measurements for the sides of the roof, and as the length of the house could be found without any climbing, the area could be discovered. The theorem of Pythagoras could be used in place of the ladder. But why didn't the family think of this simple expedient? They had learned the theorem in school. They all knew it. They all retained it. But they were unable to help themselves with it—to use it.

A large group of children were given a test in elementary algebra. It was found that most of them were pretty good at addition, multiplication, subtraction, division, factorization, and such-like operations. Then they were given another test in which they were required to solve some simple problems involving none but the operations which, as had been demonstrated, they knew perfectly well. Only a very small number succeeded. Once again we see the startling difference between retention and use. These children retained material they had been taught. But they could not see when to multiply or divide or factorize. They could not use what they knew.

This fatal difference between having learned something and being able to apply it pursues us everywhere in life. A man has studied a book on salesmanship until he knows every point made by the author and can answer any question you might care to ask ; but send him out to deal with a prospect and he fails completely. You make a fine showing on the practice tee, and hit all your golf balls far and straight ; but when you go out on the course and try to play a better game there seems no improvement at all. A man comes into a large corporation with a shining record from an important school of business administration ; but would it be wise to put him instantly in charge of an extensive and critical transaction ? One studies the chess openings, or the principles of the middle and end game ; and then over the board does just as badly as ever. School work is the richest field for such sad instances. A pupil does very well in his course in English History, but entirely fails to apply his undoubted knowledge in his course in English Literature. Physics teachers constantly complain that young people who come to them with good records in algebra and geometry seem to forget all their mathematics the moment they make contact with the new subject. And many an employer regards the so-called vocational training offered in some schools as a total loss, because young men and women cannot use their skill and knowledge when they enter business.

The fact is that there is an extraordinarily strong tendency for all our learning to run in grooves. I can tell you what I know about a subject if only you will ask me the right questions—the questions that fit in with the way I learned it. But if I have a speech to prepare or a paper to write, the relevancy of much of my knowledge to the topic in hand may never occur to me. A student in English Composition learned properly to capitalize the names of institutions of an educational or business type and words derived from the names of cities, but could not correctly capitalize the names of social-betterment institutions or words derived from the names of persons. We may be scrupulously neat in arranging our desks, but careless about dress and tolerant of dreadful chaos in our bedrooms.

A man may be almost painfully honest in accounting for every penny of the funds of a club he serves as treasurer, and yet think it smart to increase an expense account or to short-change a shop-assistant. One may acquire fine and discriminating standards of taste in music, and be crude and barbarous in one's judgment of painting or literature. One may express oneself in clear, concise, and forceful English when one is dealing with a certain group, and fall into the sloppiest mode of expression with another. Oliver Goldsmith "wrote like an angel and talked like poor poll," and there are others not unlike him. A man impresses us with his *savoir faire* in one social situation, but he may astound us by behaving like a dummy when conditions are slightly altered.

I need not spend much space in pointing out that this means inefficiency. One of the problems in streamlining a vehicle is that an arrangement which may be just right for a head wind ceases to be effective when the wind is on the side. So also a skill that will work only in one set of circumstances cannot serve us very well. I have been told that Hindu college students will memorize their textbooks until they can repeat them word for word; but when they are asked "thought questions" they cannot reply. Such learning is highly inefficient. We seek to learn anything not merely in order to have it, but also to be able to use it when and as it may be needed. Now, the vehicular engineer who deals with streamlining cannot yet wholly meet the problem of the altering direction of the wind. But the psychologist who deals with mental streamlining knows how to build skills usable in a great variety of circumstances. Let us see what should be done.

II

First of all, *learn everything so far as possible in the situation where you expect to use it.* If you are trying to master a grammar rule in a foreign language, do not just memorize it from the book. Write out a few sentences exemplifying it; and evolve a few more which you will speak, not write. If you want to make sure of some point of etiquette—how to conduct

a lady to a table in a restaurant, for instance—do not merely learn about it in words. Try it over with your sister. Writing out a speech beforehand is an excellent method of preparation if it is properly used. But it is dangerous, partly for the reason that if the speaker has studied his material only as words on paper it will almost certainly show in his delivery, no matter how well he knows it. The speech “smells of the lamp,” as the hypercritical Athenians said of the orations of Demosthenes. Write it out to fix the sequence of ideas, and then resolutely lock the script away or even burn it; and seek a solitary place where you can rehearse it with as much imaginative duplication of the actual conditions of delivery as you can compass. If you wish to improve your spoken English do not limit yourself to studying good English usage out of a book. Make the book a jumping-off place for actual practice in social conversation. If you are going on a camping trip, and want to be able to build a good cooking fire out in the open, do not be satisfied merely with reading how it is done in even the best treatise on woodcraft. Translate the instructions into practice by taking the book out of doors with you and actually building a fire.

These are but a few sample illustrations of what is meant by the principle of acquiring anything in the situation where it is to be used. The principle applies everywhere. It is of the utmost importance for efficient learning. If you will keep it in mind it can save you from two errors which learners often make, and which lead straight to disappointment.

The first is the error of supposing that the possession of knowledge guarantees effective action. Put in this clear and bald fashion the mistake seems utterly obvious. But unless you happen to be a superman you have fallen into it often enough. It is a mistake that haunts all human education, both in and out of school. We try to master a foreign language by grinding on grammar and vocabulary; and then we have trouble reading street signs and giving directions to taxi-drivers when we visit the country where it is used. We try to gain skill in mathematical analysis and the solving of problems—which is an *art*, an application—by working very hard to

acquire the operations we must use in problem solving ; and then we are surprised when problems defeat us. Continually we build up great masses of knowledge about our political institutions, or our economic system, or about physical science, or geography, or literature. But if we run into a practical political problem to which our knowledge *ought* to apply, or have to estimate the financial condition of a business, or want to deal with the electric wiring of our home, or to repair the carburettor of our car, we behave like complete ignoramuses. Our general information refuses to come to a focus. It is not at all that the knowledge is unimportant ; on the contrary, it is highly important. It is not that the knowledge cannot possibly apply to practice ; on the contrary, knowledge is power. But knowledge is power only for him who makes it so, and if we learn it merely as a matter of words, then a matter of words it remains. To become useful it must be learned in the closest contact, the most intimate integration, with its applications.

The second error is that of supposing it possible to master a skill by practising on nothing but its constituent elements. This is beautifully and very clearly exemplified in certain unenlightened kinds of music teaching. If you ever took music lessons you probably know to what I refer. I am talking about the scales and exercises and studies which are the standby of so many music teachers. Consider this contrast, for its implications are very far-reaching. A certain music teacher insists that all new pupils who come to him must work for six months on absolutely nothing but technique. Many of them naturally rebel, because they want to play pieces. Then, on the other hand, one of the greatest pianists before the public has never practised any technique in his life. From the very first he was taught to work on difficulties and problems only as they presented themselves in compositions he was endeavouring to play. Which is the sounder method ? By all means the latter. When one builds up a technique all by itself, the main problem is still outstanding—the problem of applying to practical situations all these acrobatics and stunts one has acquired quite in isolation from their actual uses.

Now, I am sure you can readily find from your own experience plenty of examples of the scale-and-exercise procedure in learning. We find it in the acquisition of games of skill, of expertness in various types of mental analysis, of foreign languages, or the ability to write good English. It is called the method of "formal drill." And always it involves a fallacy—the fallacy of trying to learn something out of touch with its applications. And its result is the multiplication of difficulties and the enormous waste of time.

The learning process is not to be understood adequately as the acquisition of knowledge or the building of habits. It has that element in it, but here is only half of the picture. Something else must be added. Learning also involves the practical use of what is acquired. *We have not learned anything unless we can use it.* Now, in what I have just said there is something misleading. I have spoken of acquisition and use as the two halves of learning. But they are not like the two halves of a stick of wood, both complete in themselves, satisfactory in themselves. Rather they are like the two halves of a human body, and must go together and be kept together if the entire affair is to live. There is no point in acquiring knowledge just to have it, or in gaining skilful habits just to gain them. And yet this is very often done. That is the reason why so many so-called "educated" people are very inept when it comes to dealing with practical situations. Knowledge is valuable as a guide to action. So it should be acquired always in contact with the kind of action we wish to guide. Skilled habits are valuable as means of increased efficiency in the meaningful functions of our lives. So they should be gained consciously and directly as factors in increasing the efficiency of various meaningful functions. Let me close this section by repeating its opening sentence. Learn everything so far as possible in the situation where you expect to use it.

III

But what if one cannot foresee the situation in which an ability is to be used? What if it must work successfully in

many and varied circumstances ? After all, this nearly always happens in greater or less degree. I am to deliver the same speech twice, and yet the demands upon me may be very different. The first time the hall may be small, and the next I may have to use amplification ; the first time the audience may be receptive, and the next time hostile ; the first time I may have plenty of leisure to come on to the platform cool, calm, and collected, the next I may have to rush on at the last moment and begin at once. No two golf shots are ever quite the same. Neither are any two sales interviews or executive decisions. It may be possible to foresee the kind of situation in which I shall *not* have to use my skill. I shall not play all my golf on the practice tee, or use my information about electricity for the sake of answering questions framed by a teacher in the very words of the textbook, or make a speech in the quiet of my study, or answer my sales prospect's questions by looking them up. That much foreseeing I can do. And I can guide my practice accordingly, which is worth a good deal. But still there will be a great deal of variety, because life itself is various. And for this I must prepare. How can I do so ? How can I learn anything so that it will not be tied to one set of conditions, but be capable of serving me under any conditions ? There are three pieces of advice to offer in reply to this question.

1. Learn your skill in more than one way. Do not stick to any single procedure. You must prepare for varied uses, so vary the preparation. Do not be satisfied with solving a mathematical problem by just one approved method. See how many lines of solution and analysis you can work out. You are not learning to solve *this* problem ; rather you are using it as a step towards the mastery of problem-solving as an art. Rehearse your speech mentally in a quiet room. Then rehearse it mentally with the radio going. Begin and end it in several different ways. Try organizing your main points in different orders and see whether you can bring them all in. Try to recall the two middle stanzas of your poem instead of always beginning at the beginning and working through to the end. In preparing a sales talk imagine as

many and as brutal objections as you can and plan your reaction to them. In working out an executive decision consider how you would modify it in many different circumstances, including even fantastic situations which are highly improbable.

A certain instructor who specializes in teaching public speaking to business men applies this principle in a very effective and interesting manner. The novice is given a clear field for his first few tries. But before long, when his turn comes to speak, the instructor makes a secret signal to the class and they all begin to heckle and interrupt as violently as they can. The novice is usually hard put to it to continue at all and to hold to any sort of continuity in his remarks. It seems most unfair. Yet the point is not the delivery of this particular speech, but the development of public-speaking ability in general. This variation of the conditions of practice turns out to be a most valuable teaching device. It is one you should use everywhere in your own self-directed learning.

The principle applies quite as well to physical skills as to the purely mental or combined mental and physical skills of which I have been speaking. To learn to drive any car, drive many cars. Do not stick always to one pet set of clubs in developing skill at golf. Deliberately alter your mode of motor approach—your grip, your stance, your mode of movement. Introduce obstacles, hindrances, mental and physical hazards.

In connection with this whole topic of developing motor skills there is a special application of our idea which is so interesting and sometimes so useful that I single it out for individual comment. Sometimes it pays surprisingly well to practise a left-handed skill with the right hand. If you have trouble with a left-hand movement, try learning it with the right hand. A transfer of training from hand to hand very often takes place and can be exceedingly helpful.

2. Another thing to do if you want to build a skill which will fit into any circumstances and serve you flexibly is always to seek for the general principles involved in it. Generalize every experience that comes to you. At the risk of being boring I want to repeat once more the basic doctrine of this book.

Learning does not depend on quantity. You do not learn by the number of repetitions you make. *Learning depends on the amount you can get from each repetition.* A few experiences on which you reflect deeply and to which you apply a drastic analysis revealing the reasons for your failure and success alike can teach you more than you can get from ten or a hundred times as much merely routine practice.

After your first attempt to make a sale, whether you brought it off or not, review the principles of salesmanship about which you have read. See how they apply to this particular case, how they seem to explain what happened. After you have made a speech, do some theorizing about the whole art of the orator as you have exemplified it—or failed to exemplify it. If you are learning to play tennis or to sing, call in physics and physiology to help you. Reflect about what you did, and why it worked or did not work. General principles are always the same. Their particular applications vary. So if you can come to see the general in the particular, you have something that will apply anywhere and everywhere, and enable you to deal with special problems and difficulties as they arise.

No one can learn a practical mastery by cramming on pure theory. What happens then is that one acquires the theory as theory—for its own sake. On the other hand, it is never practical to despise theory. Some people are so practical that they cease to be practical at all and become routine-bound automata. What the wise learner will aim at is to have theory guide and illuminate practice and to have practice give content and specific meaning to theory. An understanding of the general principles of any skill, all the way from handwriting to solving problems in the highest of higher mathematics, in terms of their actual uses and bearings upon practical working conditions, is a supremely serviceable piece of equipment.

3. Lastly, interest and zeal are direct causal factors in the creation of serviceable skills. To learn anything indifferently, languidly, with only half one's heart is not only to acquire it slowly and wastefully. It not only means swift forgetting. It also means the acquisition of something which we cannot use—if this statement is not too contradictory.

Here is a person taking a course in chemistry. He studies about elements, compounds, symbols, laws; he does some experiments, but he never exerts himself unduly. He works, but he does not work hard, and when he has studied for some time he puts the whole business from him. Has he learned anything? Oh, yes, indeed, in a sense he has. He can do something called "passing" an examination. This means that he can answer a certain number of questions as long as they are asked in the right way. But can he use his chemistry? If he were asked to make a rough analysis of some patent medicine would he know how to set about it? Probably not. His knowledge, as we say, is "book knowledge," and not very thorough at that. He has learned half-heartedly, and as a result cannot apply what he has gained. In other words, he has wasted his time.

Here is a young mother with her first infant. She is intensely interested, engrossed in the problem of nurturing and bringing up the child in the best possible manner. She reads and thinks and discusses; and, although her problem is not exactly like any other problem, so that nobody can tell her exactly what she ought to do, her knowledge functions inventively and creatively, and she succeeds. Her zeal focuses her intelligence on what she is doing; it renders her experimental in her attitude, using rules not as rules of thumb but as principles of varied application. She is the typical case of a good learner, alert to every hint, inclined to weigh every suggestion, eager for direction from any source. In her we see the operation once more of the will to learn. She is the proof that *zealous and interested learning alone can create the practically usable outcome.*

But there is more than this. Anything zealously and interestedly learned is likely to create its own uses. A man devotes himself to a hobby just because he likes it. He grows more and more expert in it. He comes into increasing contact with others of similar tastes, and with opportunities to apply his expertness. And what began as an avocation turns into a rewarding life work. This very thing has happened many times and has been a pathway to satisfaction for many and to fame for some.

So by all means hitch your learning to the practical issues of life. If you know that you will need a skill, practise it as nearly as you can in the situation where you will use it. But practise it experimentally and with intelligent insight instead of with mere routine, so that it may be flexible enough to serve you in many situations instead of just a few. Practise it with zeal, for otherwise it will be useless. And even if you cannot see any particular practical value in learning something that interests you—even though it looks like the merest of hobbies—still do it as well as you know how, because it may be a reorganizing point and a factor for success in life if you do, and will certainly not go far if you do not. If it pays to learn anything at all, it pays to learn that thing well. If you are to streamline your mind at all, see that you shape it for efficient use in all degrees, stresses, and directions of wind and weather.

CHAPTER SEVEN

ACQUIRING PHYSICAL SKILL

I

Now that we have considered the principles which must control all efficient learning, and have reached an understanding of what it means to organize the will to learn for effective outcomes, we are ready to apply our knowledge more specifically to various definite situations and problems. And in this chapter I shall discuss the acquisition of physical skills.

Most of us have spent or will spend considerable time in trying to gain various physical skills. We want to be able to use tools, to shoot a gun at least fairly well, to use a typewriter, to write more legibly with a pen, to fly an aeroplane, to play a musical instrument, to throw a ball, to swing a golf club, or to wield a tennis racket. We have tried to learn such things, with varying degrees of success. But very often we have wasted tremendous amounts of effort and time and fallen most unsatisfactorily short of our possibilities, all for want of the knowledge which psychology can supply. The points to have

in mind if you wish to acquire a physical skill as quickly and as completely as may be can be stated quite simply and authoritatively. They apply to all the types of motor performance I have just mentioned, and to many more besides.

At the very outset of any such learning what you need to achieve is a *proper direction of attention and will*. Let us try to see the problem clearly. In any motor performance there are two great sub-divisions. There is the end or aim you wish to achieve; and there are the movements you must make. There is the place you want to send the ball, and also the motions of hand, arm, shoulder, and body needed to send it there. There is the target with its bull's-eye two hundred yards away, and also the problem of holding the gun, peering through the sights, and squeezing the trigger. There is the line ruled fair and straight across the plank, and also the delicate muscular co-ordination required to send the saw along it. On which should you concentrate, the goal or the movement, the end or the means?

I have little doubt as to the answer. You should concentrate on the *movement*, on the *means*. Whatever may happen when you become an expert, as a novice you are not chiefly concerned with immediate results. You are not trying to drive the golf ball two hundred yards, but to acquire a swing. You are not trying to typewrite letters fast and accurately, but to accommodate your reactions to the keyboard. One chief reason why physical skills are often acquired too haltingly and inadequately, and why large amounts of practice yield such poor returns is that the beginner allows himself to develop a fixation upon results.

Premature anxiety for results in motor performance is bad for a number of reasons. It leads the novice to tolerate co-ordinations so obviously clumsy that he cannot possibly go very far, and is doomed to pay a preposterous price for even a very mediocre advance. If a man is desperately anxious to be able to do at least something with the typewriter he is apt to permit himself to fall into the atrocious habit of using only one or two fingers of each hand, and also to keep his eyes chained to the keys. But it is clear as crystal that any sort of

effective skill demands that one shall use all four fingers of each hand on the keys and both thumbs on the space bar, while keeping one's eyes free from searching for letters. In the same way, the copybook method is not the procedure to improve your handwriting. If you are a bad writer, the trouble lies in your motor co-ordination; and there it must be corrected. And again, we know that the reason why so many golfers and tennis players fail to improve is that they just play golf and tennis; they think only of the game, the score, the result, and hardly ever of the complex of action which must be set up for increased efficiency.

And then a concentration upon results perverts our attitude towards mistakes. A mistake can be either a valuable opportunity or a serious stumbling-block. Which it will be depends on our attitude. Watch the novice on the rifle range. He lies down, sights, shoots, and misses. What next? It is a crucial question. Perhaps he curses in a low tone, reloads, and tries again. In that case he is not better for failing. The expert beside him smiles. He has seen that the novice has not held his breath just before firing and that he has jerked the trigger. *This is what the novice himself should have learned.* But he was so interested in the bull's-eye that he forgot the movement pattern. You can see exactly the same thing any day on any golf course; and it is the reason why a professional will often advise beginners not to keep score. In one sense the novice ought not to care in the least about mistakes. He should not worry about failing to achieve his goal. In another sense he ought to attend to them very carefully, for they serve to indicate to him where the co-ordination has gone wrong.

A student who tries to pass an examination by a last-minute cram is sure to learn badly. He has got himself into a situation where the immediate result must dominate everything. In the same way a person acquiring a motor skill who permits himself to be in a sort of perpetual examination fever, and who makes each attempt as if his life depended on immediate success, will very gravely compromise his own chances. Concentrate primarily upon the type of action you must establish and let the chips fall where they may. Ignore results except in so far

as they provide useful indications of the success or failure of the co-ordination itself.

On the other hand, in turning your attention away from results, do not rush to the opposite extreme. When I advise you to concentrate primarily upon the action-picture you must create there are still plenty of ambiguities, still plenty of chances for learning to go wrong. The advice must be amplified and made more specific.

For instance, there is the common mistake of practising the co-ordination all by itself, isolated from its natural setting. Here are some instances : Practising golf always on the practice tee, or at the net, or without any ball, or even without any club—each stage being one step further removed from the natural setting of the course : practising shooting with blank cartridges, or without any cartridges, or with a stick instead of a rifle : practising the piano at a dumb keyboard ; practising tennis at a wall, or without any ball, or even without any racket : practising the writing movement with a dry pen, or with a piece of stick, or without anything at all in one's hand. Such drills may be used occasionally, but only as need demands. If you wish to correct a wrong reaction a few minutes of thoughtful concentration on such work may help. But it certainly should not be the staple procedure. The isolated reaction is almost always different from the complete co-ordination made in a natural setting ; the difference may be quite slight and yet very important. Moreover, a skill which is perfectly established in an artificial condition will often refuse to work when we try to transpose it into a natural one. Not only is there a difference in many details. All sorts of anxieties and distractions arise, and *to master these and preserve one's concentration in spite of them is part of expertness.*

And then there is the mistake of running to extremes in the matter of analysis. Some golf instructors have worked out about twenty-five points which determine the perfect golf swing. I know a lady who was taught by one of these gentlemen and told to recapitulate every point of the twenty-five each time before she tried to hit the ball. She became hopelessly confused and made very little progress until she

transferred her allegiance to another professional, who used a far simpler and scientifically sounder method. There was a very good reason for this. Not all the twenty-five points are of equal importance. If a person can succeed in following one of them, perhaps five more will automatically follow in its train ; and if one observes three or four, all the rest will take care of themselves. To be sure, they may constitute a complete inventory of what the expert golfer actually does. But why burden one's mind with needless details ? The expert himself assuredly does no such thing. Moreover, the considerations that are important for one person may not be so for another. Furthermore, the crucial matters at the commencement of learning may have receded into insignificance by the end of a fortnight, and others may have taken their place. The acquisition of a motor skill is a complex, shifting, highly individual affair, and it should never be treated as a fixed sequence through which everyone must pass in exactly the same way.

The proper approach is to try the skill as far as possible in its natural setting, and to try it as one single whole. When you run into difficulties and make mistakes, dig down to the causes, which always lie in the action pattern, and set about extirpating them. Doing this patiently again and again until persistent errors are rectified is the way to learn. When a gun crew on a battleship fire the sixteen-inch guns at a target they do not necessarily expect to hit it at the first try. The opening salvo goes too far. Then the range is reduced, and the next falls short. By repeated attempts the bracket is closed until the guns are registered accurately. This is a perfect analogy for the acquisition of motor skills. We must not practise in the abstract. We must have a goal before us, and aim at it. But we must not be terribly concerned if we miss. We must make our error a signal to alter our adjustments. And we must keep on altering them until we have them right.

II

If you have ever been coached in any kind of physical skill you are almost certain to have been told that you must *relax*.

The advice is good and sound as far as it goes. But it does not go far enough ; nor is it altogether good or sound. Indeed, in a certain sense it is preposterous. Nothing whatever can be done in a state of complete relaxation. Relax your arm and it will dangle at your side. Relax your whole body and you fall to the floor. The tennis player delivering a vigorous serve, the typist rushing off a hundred words a minute, the marksman concentrating on the target, the singer giving out a fortissimo passage, are anything but completely relaxed. On the contrary, they show a high degree of energy and an interplay of action and reaction that may rise to the heights of actual violence.

Still, the expert physical performance does exhibit a certain ease and economy. There is an absence of strain and tension even when it is most vigorous. The expert works far less hard for his results than the novice. If you doubt it watch a long-distance runner winning a championship, and then compare him with a sedentary business man sprinting for the eight-fifteen train to town. Relaxation of this kind, if that is what you want to call it, is most certainly very desirable. It is a relaxation not of all tensions but of needless tensions, an elimination of needless resistances. Expert performance is not so much merely relaxed as streamlined. This is a mark of all successful skill.

But one cannot produce it by a mere act of volition. It is very little use for a coach to order you to relax. He is really ordering you to behave like an expert. *You learn to relax as an essential part of learning the skill.* Relaxation—or, perhaps better, streamlining—means the proper organization and direction of muscular and nervous energy. To understand it properly is to understand the nature of the skilled act. To work for it properly is to set up the learning process for the most effective acquisition of the skilled act.

1. First of all you should think of any motor skill you may wish to acquire as a pattern or action carried within a framework of posture. Certain parts of your body must move in order that the pen, or the typewriter, or the ball, or the saw, or the racket may move too. But certain other parts of your body

must be held steady, but not rigid, in order to support the movement. A common trouble with any novice is that he fails to isolate the movement he wishes to make. When he tries to throw a ball his whole body pivots wildly. When he tries to drive a saw his entire body, from the ankles up, moves up and down. When he swings at a golf ball he totters and staggers and is forced to break his stance to avoid falling. All these are signs that the action is not properly framed.

You know what happens to the mechanism of your car if the main bearings become very loose. Step on the accelerator and the engine may tear itself to pieces. The flow of energy spreads in the wrong direction. It is allowed to spill over indiscriminately. And it becomes, not merely ineffective, but dangerous. This obvious illustration should show you how imperative it is to organize a framework of control, a set of bearings, to support any physical action whatsoever. As you experiment and try, first one way and then another and then another, always be on the look-out for this. Always try to build up an increasingly sure feeling of the action moving in well-defined points of support and control. This is part of the secret of relaxation—the proper organization and direction of energy.

I have spoken of organizing action within a framework of *posture*, but this is not quite the whole story, for it has been found that our visual perceptions during action have an important effect either as stabilizers or perturbers. A group of championship weight-lifters proved incapable of working up to their limit of capacity when they were surrounded by absolutely homogeneous grey walls. Physical balance and the feeling of a well-established posture were not enough. Their eyes needed "something to take hold of." So the direction of the eyes has a great deal to do with the proper acquisition of a motor skill. This is the reason why golfers have discovered it so important to keep one's eye on the ball. Not only does this tend to hold the head and upper trunk steady. Not only does one see what one is trying to hit. One has an axis of visual reference which has a strong stabilizing influence. So with typewriting the value of the touch system is partly that one can follow copy much better if one is not tied to the

keyboard. But this is not all. Indeed, it is very probable that the best performance an expert can put up is not attainable if she fixates the copy continuously. The best possible performance seems to take place when one can orient oneself by an occasional glance particularly at the outside edges of the keyboard. And, unless one has learned touch system one cannot do this, for one has to watch all the time and direct the fingers by the eyes. So I would very emphatically advise you to consider just what your eyes are doing and what things you are seeing as you organize a skill and try to make it work.

2. Within the framework of posture and vision you organize your action-picture. And always your business will be to obtain the maximum result with the minimum energy, which is simply another way of saying that you learn to relax. You are seeking to streamline the action-picture.

But how is this possible? How does a tense movement differ from one that is relaxed? An understanding of this point is of considerable practical value. Let us take one of the simplest possible cases. Flex your arm from the elbow. Your forearm has a certain weight, and so it takes a certain amount of force to pull it from the horizontal to the vertical. And the force is exerted by the flexor muscle of the upper arm. But this is by no means all that happens. Suppose that when the flexor pulls, the extensor—the muscle you use for straightening your arm—refuses to let go: What will happen? A resistance is created. There will be a fight between the two muscles working in opposite directions. If the energy they exert is exactly equal, the arm will not move at all, though you will be conscious of a great deal of strain. Or if the flexor slightly overbalances the extensor, the arm will bend, but only with great difficulty. The effect is one you can readily enough produce. And it shows you at once the difference between a tense and a relaxed movement, and also the reason for the difference. Some energy is needed to move your arm at all, because it has weight. If you have a ball in your hand, more energy will be needed. But if you do not switch off the extensor muscle—if you allow it to continue pulling—you add just that much to the force you must exert; and you seriously

impede the movement. *Tense movement occurs when the body is pulling against itself ; free or relaxed or streamlined movement occurs when all antagonistic and disturbing pulls are switched off.*

Of course, in using a saw or a typewriter, or playing a violin, or hitting a tennis ball, the possibilities of antagonistic and disturbing pulls are enormously greater than when you only flex your arm, because the action is so much more complex and involves so many more parts of the body. Singing, for instance, is one of the most intricate performances of which the human organism is capable, because you have to use all your breathing muscles, the muscles of the vocal chords, and the muscles of the jaw, the throat, the tongue, the lips, and the face. It can go awry at any of these points. And it is extremely hard to teach because so much of the action takes place deep within the body, where no one can watch it for the sake of correcting faults. But in all instances, from the simplest to the most complex, free action means getting rid of all the pulls and stresses which hamper the grooved and directed swing. This is the aim towards which you must work.

Here is an added reason for practising any skill as a whole, instead of chopping it up into little bits and trying to learn it piecemeal. You must get the feeling of the entire movement coming more and more freely. You must sense the cranks and pistons and eccentrics and gears turning over with less and less internal resistance. And this is possible only by turning them over as well as you can. Of course you do not merely repeat. You do not merely operate the imperfect mechanism in the vague hope that it may work better. You stop and "tinker." You correct a movement here, tighten up a loose connection there, and release counter-pulls and points of friction everywhere. You practise a few back-swings in isolation. You sight the target once or twice with the unloaded rifle. But such moments of analysis are always and only *and immediately* for the sake of the continuing evolution of the total pattern to higher and higher levels of ease and effectiveness.

3. Remember that the progress of your skill towards perfection means the achievement of a given result with a decreasing amount of energy. The ideal condition would be

one where we had to use just enough energy to move the limbs and whatever physical instrument we might be employing through the necessary course. I doubt very much whether this is ever attained, for even in the most expert performance some antagonistic and disturbing pushes and pulls are probably still present. But this ideal state is approached always by building up steadily better and more economical controls. And here must be one of the focal points in your learning. What you must do above everything else is to seek and find these better controls.

Do not rely on repetition as the means of acquiring a physical skill. Repeat you must. But grudge every repetition you are compelled to make. Preserve and maintain the experimental attitude. Vary your approach in every conceivable manner. Constantly be in search of better and easier ways of putting the movement through. When you fail, try to analyse the reason for failing. When you succeed, try to catch the feeling of success. And, when the feeling of the successful act has established itself, see if you can find a method still better. Get a rational picture of the action you must establish, whether from instruction or from reading or from thought. Watch your shadow, study your reflection, and try to see what you are doing. Roll up your sleeves or strip to the waist so that your bodily movements can be seen more exactly. Close your eyes and concentrate on the inner feeling of your muscles as they move. But in all this stick to the *total* movement and do not try anatomical or physiological analysis, which is very dangerous and usually hampers far more than it helps.¹

When things go wrong with a physical skill, it is the controls that have gone wrong. When a physical skill sticks on a plateau and refuses to improve, the failure lies in the refusal of the controls to become reorganized. And, when progress takes place, the controls have become more efficient and the machine has been hung on a new and more perfect set of

¹ For instance, some voice teachers tell their pupils to try to get the feeling of the action of certain single muscles in the throat, mouth, and tongue, and it nearly always makes trouble.

bearings. Solve the problem of control and you have solved the problem of relaxation also.

III

There are a number of practically valuable gleanings from research on the acquisition of physical skill, all of which become entirely understandable in the light of what I have been saying.

1. In learning such a skill never push—or hardly ever. Nearly always work easily and gently. Straining and pushing, trying to speed up and work hard, is almost certain to disrupt the co-ordination. Your brain shoots such a rush of energy down along the motor nerves that the whole circuit becomes overloaded. The current jumps over into pathways where it has no business. And before you know what has happened muscles which should be quiescent are thrown into action and the body is pulling against its own resistances. You can completely defeat yourself and ruin all your chances of improvement by this trick of over-forcing. Think of yourself as a sculptor hewing a pattern out of a block of stone. If you put your chisel into position and come down on it full force with your hammer, you may split off so large a chunk that the entire work is spoiled. So also with the job of fashioning a streamlined pattern of articulated and balanced action out of crude and formless beginnings.

On the other hand, it would be a very bad service to advise you to go too slowly. Yet sometimes this counsel is given. The singer is told always to sing softly; the novice golfer is commanded never to hit a ball more than fifty yards. There is a good and clear reason why this is dangerous. When you deliberately and consciously try to “pull a punch” you are very apt not to diminish the positive energy you throw into it, but to damp that energy down with the braking effect of antagonistic muscles. Take your driver, tee up a ball, and try to hit it ten yards. See what happens when you endeavour to pat a tennis ball ever so gently. Try to emulate a slow-motion film when you sign your name. Nearly always in such

cases you will be conscious of constraint and discomfort, and very often the effort ends in laughable failure. The co-ordination becomes confused, and the braking effect of the antagonistic pulls blurs all the clear lines of well-placed effort. It takes even more skill and control to make a motion that is finely graded and gentle and have it still remain free than it does to put forth great strength.

What we should always seek in practice is a clear, clean effort that feels clean and clear. And this can be disrupted either by over-forcing or undue constraint.

2. Any skilled action is marked by one or more of three characteristics which differentiate it from an unskilled action. It can be performed rapidly. It can be performed with few mistakes. It can be finely graded—putting and billiards affording two of the best examples of this last. Every one of these characteristics depends upon the same condition—a free-moving pattern of action well hung in a definite supporting frame. If you find any of these factors lacking—if your movement is slow or inaccurate or poorly graded—do not work for them directly. Try to improve the total pattern of movement itself. See if you can reorganize the essential controls on a higher level. What you need is not *more* practice, but *better*, more analytic practice.

3. It is sometimes helpful to establish a conscious rhythmic control in practising a skilled act. Typists are often helped by practising music and co-ordinating their keyboard performance with the rhythm of the music. A famous woman golfer has said that she has a short jingle of poetry to which she times her drive. Devices of this kind can be helpful because they tend to establish a strong sense of a unitary and complete pulse of effort. They are among the means of avoiding the excessively and viciously analytical approach of which I have spoken.

If no such device seems suitable to the problem which you are facing, the same effect can often be produced by the control of the breath. Draw in the breath just before you launch your effort and let it out when the body relaxes at the close. Once more this tends to hold everything together in an effective living unity.

4. Wonderful economies both in learning and performance have been brought about by rationalizing skilled performance. The so-called efficiency movement in industry began when Taylor studied the motions of workmen loading pig-iron on to trucks and saw how tremendous losses due to awkwardness could be cut out. This has a bearing on every skill. Most of us go in for a very great deal of lost motion in everything we do. And lost motion compromises efficiency because the muscular pulls necessary to produce it are apt to get in the way of the movement-pattern we are trying to create. So always have as clear a picture of your skill as you possibly can. Reduce it, so to speak, to its least common denominator. And then criticize yourself again and again to be sure you are not allowing some needless elements to slip in.

But do not take your model or scheme as a rigid pattern to which you must conform. Every one of us has his own individual style, due to the configuration of his body and the operation of his mind. You are not tied to the exact specifications of any blue-print, and any teacher who tries to force such a blue-print upon you is to that extent foolish. Understand the essential principle of the skill, and then build your own skill to conform to that principle in your own way.

5. Lastly I wish to mention again a point I have discussed elsewhere. Do not suppose that physical skill depends chiefly on physical strength. It depends rather on the *economy* of physical strength. So draw a distinction between practising a skill and building muscular power. In a skill involving fine movement and the use of the minor muscles it may be actually dangerous to work for strength as part of practice. Many a piano pupil has given himself neuritis of the forearm by doing this very thing. The best strengthening exercises usually have very little resemblance to skilful acts. In working for strength use movements which give you full muscular contractions and expansions, and use them with care and discretion, particularly if the muscles involved are small. Strength and skill are separate in theory. Keep them separate in practice.

CHAPTER EIGHT

EATING, DRINKING, SMOKING, SLEEPING

I

WHEN you read the title of this chapter you may be inclined to exclaim with some indignation : "What right has a psychologist to tell me about eating, drinking, smoking, and sleeping?" Now, of course, it is quite true that in his professional capacity the psychologist is neither a dietitian nor a doctor ; and he would be most unwise to trespass upon the preserves of these experts. It is not his business to tell you what you should eat and drink, whether you should smoke, or just how much sleep you need. Certainly I do not intend to take the responsibility of trying to do this. But psychology has a word to say on all these subjects, just the same ; and, although it is a most important word, it is very rarely uttered. Everyone knows that diet, the use of tobacco, and sleep have a very powerful effect upon one's efficiency, both physical and mental. If you want a mind that is a swift-moving, powerful, effective instrument it is essential to control and direct these processes properly. *And the proper controls can be learned.* Indeed, their establishment depends upon learning. Here is where psychology comes in. It is where the doctor and the dietitian often fall down. They can give excellent advice about what to do. But very often they neglect to tell one how to set about following it. This is exactly like giving one a perfect and detailed picture or account of how to hit a golf ball, and then telling him to go and hit it that way. It overlooks what is for most of us the precise point of the problem—how to learn to do so. Many a person has obtained from some expert a splendid dietary regime, and then found it almost impossibly hard to follow. Usually he attributes this to "weakness of will." But he would not say that the reason why he fails to follow the instructions of a golf professional is that he lacks sufficient strength of will. He would say that he had not yet

learned to do so. Much the same is true with the control of diet, smoking, and sleeping. Control here as everywhere else is something that we must learn. To be sure, the will has much to do with it ; but not in the crude sense of mere fierce determination. The will has to do with it because all learning depends on the will to learn. Here as always our problem is to build the control we want by the intelligent organization and focusing of the will to learn what we desire to learn.

II

Let us begin with diet—with eating and drinking. At first sight you may think that learning has nothing to do with diet. You may suppose that we eat and drink whatever we want or what somebody—a trainer or a physician, for instance—tells us to eat and drink, and that there the matter ends. Now my immediate business must be to scotch this notion, or else you will never make an intelligent approach to the problem, which after all is one of the major problems of the efficient life. If you don't believe that learning applies at all here, you will never try to learn, you will never use the principles of learning, you will never organize the will to learn. And so I must do my best to show you that diet practices are ways of behaving, and that like any other ways of behaving they can be acquired if you set out properly to do so. What and when and how and how much you eat and drink are all of them things you learn. You may learn consciously or unconsciously. You may learn practices that are proper and wise or improper and harmful. And if you want to change your present practices and acquire better ones, your problem is exactly like that of altering your golf swing—it is a problem of learning.

The point of view I am going to present is taken from the most helpful book on the subject that I know, by the Spanish psychologist Ramon Turro.¹ Turro insists that hunger is not a mere sensation in the stomach, but that it is a demand for food. I cannot repeat here all the evidence he offers to prove his point. Among many other things he remarks that people

¹ *Les Origines de la Connaissance.*

who have had their stomachs surgically removed still feel hungry; and also that starving people do not want to eat inedible substances such as sticks and stones, though these would stop their stomachic pangs. But he goes also a step beyond this. He says that hunger is not just a demand for food, but a demand for *a balanced ration*. The body in the course of its activities uses up various substances—albumen, glycogen, iron, iodine, calcium, and so forth. When you have gone for some time without food the supply of all these substances becomes depleted. The body begins to cry for more. And this cry we call hunger.

Moreover, besides this general, or, as Turro calls it, "global" hunger one may have special hungers. He tells of a woman placed on a salt-free diet as part of her treatment for epilepsy who managed to sneak out of the hospital ward and was found wolfing salt in handfuls. Whenever the diet is unbalanced, whenever the supply of some special substance needed by the body is depleted, we develop a special hunger. The most striking and familiar case is thirst, which is due to the depletion of a special substance, water.

So far we have no inkling of the rôle played by learning. We have only a basic, organic, chemical drive. But let us return for a moment to the idea of general or "global" hunger. This is the demand of the body for a balanced ration, a large array of substances in certain proportions. These we must have, within reasonable limits, in order to live or at least to continue functioning efficiently. But we can get them from a whole series of entirely different foods. The Dyaks of Borneo, the bushmen of Central Australia, the Greenland Esquimaux, and the denizens of Mayfair eat very different foods. But they all satisfy the same hunger. They all take on the same chemical reinforcements. Within the limits set by nature an enormous variety is possible, a variety greatly extended by the invention of the tin can and the refrigerator. And the particular variety of food choices with which we satisfy our primitive hunger and still the primordial organic cry which is always the same is an acquired taste. *The particular pattern of eating which we follow is something learned.*

So, if you wish for any reason to establish yourself in a certain dietary regime, *treat it as a problem of learning*. This is the intelligent way of handling yourself in what is often a difficult situation. It will not always succeed. One cannot always promise success in any job of learning. But it is the mode of approach most likely to bring success.

First you must have a strong and definite will to learn. How great is the influence of the will to learn in controlling appetite we can see exemplified in the experience of Vilhjalmur Stefansson. Stefansson is not only an explorer of the Arctic wastes, but also a notable and doughty adventurer in novel nutritional realms. In his various writings, such as *The Friendly Arctic*, and his articles in *Harper's Magazine* for November and December 1935, he tells the story of his experiments with food. Many years ago he found it possible to travel for long periods of time over the frozen ocean carrying no food with him, living "off the country," and eating nothing but ordinary meat without salt. He had convinced himself on scientific grounds that a man could do this because such a diet, though very monotonous, contained an adequate balance of the necessary chemical ingredients, and when he put his theory into operation it turned out to be true. He tells us also that the companions he took with him from time to time differed greatly in their ability to adapt themselves to this tremendous change in their normal way of living. Some of them were very fearful and concerned, expected great hardship and misery, and were always dreaming of civilized food in civilized variety. Such men suffered seriously, both physically and mentally. Others had sufficient faith to believe that what their leader did they could do. They attacked the challenge with a certain confidence, a certain buoyancy of spirit. And they experienced no great trouble. I think I am doing justice to his views when I say he concluded that *mental attitude* was enormously important, and perhaps the determining factor in bringing about a successful dietary adjustment of a kind far more extreme than you will ever be asked to undergo.

Turro gives an interesting example which confirms this idea negatively. On a certain famine-relief project in India the

relief workers were unable to obtain supplies of millet, which was the familiar staple food of the people. So they loaded the trucks with wheat, of which they had plenty. But when this was offered, the starving people burst into tears at the sight of the strange provender, and crept away to die ! There was no will to learn, and the lack was fatal.

But mere will, mere determination, mere willingness to explore and to experiment, although very essential, are not enough in establishing oneself in a new dietary regime. The will must be organized and focused, here as everywhere else. And perhaps the first step in doing this is to have a clear picture of the nature of the regime and a reasoned belief in its feasibility. Certainly this is how Stefansson handled his companions. He gave scientific reasons for holding that a salt-free diet of nothing but meat was healthy and adequate. He did not try to impose it by fiat. His companions knew not only what they were required to do in a general way : they were given a picture in detail, and also had the reasons presented convincingly and adequately. The will to learn and to try was put on a basis of reason.

Then, in establishing a regime of diet, do not neglect the element of pleasure. When we feed we actually and realistically make up the chemical deficiencies of our bodies ; and what we call hunger is the emergence into our conscious life of these deficiencies. But there is a great deal more in it than this. Feeding is not mere stoking. It is not like pouring petrol into the tank of a car. It is supplying the needs of a living, conscious creature, and the creature's likes and dislikes are an important factor in the process. The way food is prepared, and the way it is served, and all the circumstances that surround the act of eating are extremely influential. Food and drink taken in pleasant circumstances are actually more beneficial than the self-same chemical elements thrown rudely and roughly into the body. The flow of the digestive juices is facilitated, and all the assimilative processes go on better. On the one hand, we know that a violent emotional shock may stop the digestive processes absolutely, which is the reason why you feel you cannot eat if you have just been frightened

badly, or angered, or grieved. On the other hand, it has been found that pleasant circumstances at meal-time—for instance, listening to soft and enjoyable music—actually promote the mechanical and chemical operations of assimilation. Our pleasure in a meal is a sign that it is doing us good.

Here again we take a leaf from Stefansson's book. He found that the parts of a carcase which are most desirable when the meat has been hung for a while and when it is to be cooked with various added flavours are not by any means the best when it is to be eaten quite newly killed and without salt. And he planned his own and his companions' meals always so that they would be as enjoyable as possible.

So, in directing the will to learn towards the establishment of a dietary regime, plan to make the experience of eating and drinking always as pleasant as possible. Of course there is a very common perversion of the rôle of pleasure in eating. Many people simply run amok in the matter of diet and eat chiefly for fun, giving free rein to any transient whim they may happen to feel. These are they who "dig their graves with their teeth." But the alternative is by no means a sober existence sustained by tasteless crackers, uninviting lozenges, and pallid vegetables. One should not eat whatever one likes. *But one should like what one eats.* The way the food is prepared, its appearance when it comes to the table, the detail of the service, and the social setting of the meal are all of the greatest importance. To these things we respond profoundly and with amazing readiness. The extent to which you can *learn to enjoy* is a surprising and encouraging experience, and one by all means to be sought in establishing a sane nutritional regime. Also, if you wish to set up such a regime you would probably be wise not to frequent expensive restaurants where you may have to gaze longingly over a tempting and seductive menu and to watch folks "guzzling" to left and right. Obviously this will be apt to unhinge the will to learn, which is your chief reliance.

Then there is another important factor with which you have to reckon. While there is a theoretically perfect or balanced ration, yet this balance can be disturbed by long-continued

dietary abuse. If you have eaten too much or too little of some substance over a period of years, the demands of the body have become somewhat abnormal. (I use this word not in a derogatory sense as something necessarily dangerous or bad, but only in its literal sense of a departure from a standard.) Now, if you make a sudden change—if you abruptly cut out meat or sugar or abruptly add something new—you will certainly make trouble for yourself. You will develop a special hunger or a special satiety. Your body will begin to yell for what you used to give it, and the yells may become so insistent as to be very upsetting. Of course if your doctor tells you that it is sure death to go on eating sugar, there is nothing to do but put up with the situation. Or if you propose to accompany Mr. Stefansson on an excursion to the North Pole, you will no doubt have to endure a certain degree of salt-hunger for the first month. But ordinarily nothing quite so radical as this will be required. Begin slowly. Cut out sugar only in your coffee. *And learn to like coffee without sugar*—which certainly can be done. Gradually, systematically, with a schematic plan, go on from strength to strength. In a year's time your friends will be marvelling at your fortitude. But from your point of view it won't be fortitude at all—only the natural expression of a new set of tastes.

III

Next as to smoking. How much smoking depends upon mental controls and attitudes has been demonstrated in a very interesting experiment performed some years ago at the University of Wisconsin. The experimenter built a trick pipe which had in its bowl an electric heating unit and an appliance for humidification. Thus it was possible for a person to puff on this pipe and "smoke" nothing but warm moist air. The subjects were brought into a small room where one or two persons were smoking vigorously, so that there was a full-bodied and healthy tobacco odour. Then they were blindfolded; and sometimes they were given a pipe of tobacco, and sometimes the pipe with the heating and humidifying appli-

ances; in each case they puffed for twenty minutes. The secret, of course, was never divulged—that is, they did not know that there was even a chance of their being fooled. And the result was most illuminating, not to say humorous. Out of a large number of subjects not a single individual was able to tell when he was not smoking tobacco. The real smoke and the sham smoke were all the same to them. And this was true even of experienced smokers. In fact some of them would make a report somewhat as follows: "To-day I came in wanting a smoke quite badly, and I enjoyed my twenty minutes very much." This was a response to sucking in and breathing out slightly modified atmosphere! Or again, the actual use of tobacco would be criticized as thin and unsatisfactory, and the subject would express just the shade of a suspicion as to whether he had really been smoking at all, and if so, what kind of tobacco.

This is enough to bring us up with a considerable jolt, particularly as it is confirmed by research dealing with the use of other drugs. Many, but not all, of the effects of coffee or tea are obtained in a person who drinks something that looks, smells, tastes, and feels like one of these beverages but really is not—so long as he does not know the difference. Moreover, if we give a person a tablet of *cafein* containing exactly the same amount he would get from a cup of coffee, it will not have the same effect upon him. There is no doubt that many of the minor drug effects are to quite a noticeable degree not physical at all, but mental.

Of course if one has used such a drug as nicotine or *cafein* or alcohol for many years, the situation is somewhat different. The intimate operations of the body have adjusted themselves to the substance. A demand has been created. A definite special hunger has been established which may require heroic measures if it is to be extirpated. Moreover, no amount of mental control will stop you from becoming intoxicated if the alcohol content of your blood rises beyond a certain percentage. But even the effects of alcohol are mental to an appreciable degree. Cocktails, wine, and beer affect people differently. It is not just a matter of taking on board so many cubic centi-

metres of grain alcohol. Moreover, there is a further paradox. Alcohol is not usually considered scientifically as a stimulant. It is a depressant in many of its effects, and seems to operate by destroying inhibitions and controls rather than by building up positive impulses. But in its social manifestations it seems exhilarating, often to an undesirable degree. Partly this is due to the direct breaking down of inhibitions. But also a large part of the reason is in the general ritual and social situation in which it is taken. Alcohol would be far less popular than it is if the only way to administer it were in private with a hypodermic syringe.

The same idea certainly holds in the case of smoking. When you smoke, a certain amount of nicotine is taken into the system. How much and in what ways does this affect you? The experiment at the University of Wisconsin was set up to find the answer. You recall that the subjects were unable to tell whether they were really smoking, whether they were receiving a dose of nicotine, or not. Precisely the same *mental* effect was produced in them by puffing warm moist air and tobacco smoke. And with the mental effect thus ruled out of the picture, the differences were surprisingly slight. Twenty minutes' use of tobacco brought about an increase in the external blood pressure, and a somewhat enhanced degree of muscular unsteadiness. But the performance of the subjects on the dozen or so tests of mental and motor performance that were administered was almost the same whether or not they had been using tobacco. Of course, the investigation did not bear in any way upon the influence of tobacco upon general health, or upon what happens when it is used to excess. These perhaps are medical rather than psychological considerations, in any case.

Now, what can we gather from this? Surely that the most important effects of smoking are due to suggestion—that they are psychological rather than physical. Much of the cigarette advertising is quite false in its implications. Certainly nicotine is incapable of giving anyone a "lift" or of decreasing his fatigue. But still a smoke may be a welcome relaxation. It is a break in the continuity of action, which gives us the oppor-

tunity to take a fresh grip upon ourselves. But it would work exactly as well and help us just as much to inhale warm air through a glass tube—if *only we could persuade ourselves we were smoking*. What we really want is not the nicotine, but a moment's opportunity to pause and to play. Disraeli, a non-smoker, in a famous and critical interview with Bismarck during which the German puffed constantly on an enormous pipe, smoked also because, as he said, he would not let the other man have an advantage and was willing to die for his country. That is exactly the point. Bismarck's advantage lay not in the nicotine to which he was treating himself, but in having a plaything with which he could fumble and perhaps a screen of vapour behind which to hide.

And the results of our gleaning suggest how to set about the control of smoking. First and foremost you should remember that you are not dealing with a potent and exacting drug habit, unless indeed you have used tobacco excessively for a long time. You are trying to control a sort of trick which you have integrated into the texture of your day's doings. Other tricks can be substituted: reaching for a sweet instead of a cigarette; chewing a rubber band; playing a harmonica; or following the custom of certain races in the Near East and carrying a secular rosary of beads to play with. Certain changes in the routine of your living and acting so that the natural breathing spaces in the sequence of behaviour do not become puffing spaces are quite apt to affect the matter also. A person who smokes a great deal if he must sit still with nothing to do will smoke less if he is active indoors, and less still when active out of doors.

On the whole our psychological results—which, let me warn you, are far from conclusive—would seem to indicate that a flank attack is more hopeful than a head-on collision. If you abruptly make up your mind never to use tobacco any more after having become well accustomed to it, you are running into serious difficulties. You must overcome the constant suggestions of advertising and of the sight of other people indulging. And the very vow you have made will draw your mind to the seductions of nicotine with all the force of a high-

powered magnet. Such a frontal assault can succeed, but it is a desperate remedy. It is apt to work only when you are under the spur of real necessity—for instance, stringent instructions by a physician or a trainer. If the tempter's gentle whisper of "Why not?" cannot be answered convincingly it will quite probably lead you astray.

Probably the least intelligent procedure of all is to try to restrict yourself to a daily ration of so many cigarettes or cigars or pipefuls. The mere accounting effort of counting your blessings is absolutely certain to make you want to increase them. You are doing exactly what you ought not to do. You are focusing your mind on the business. And every pause becomes an invitation and every break in the sequences of activity a yawning chasm begging you to tumble in.

Treat the "tobacco habit" as what it really is—a sort of game you play with yourself, a kind of solitaire—and you give yourself the best chance of controlling it.

IV

Lastly I come to sleeping. I do not intend to try to tell you how much sleep you need, or whether you should retire early and rise early or endeavour to arrange an afternoon siesta. Ask your doctor for advice on those points if you think you need it. I am going to present very briefly the psychologist's point of view about sleep and its relation to learning.

First of all the psychologist regards sleep as a type of physical and mental response, a type of behaviour. And it is a response to *monotony*. The lower animals up to the level of guinea-pigs can be put to sleep by taking them into a quiet place, covering their eyes, and holding them so that they cannot move. After a few struggles, off they go! With higher creatures, and more particularly with man, monotony is not so easily attained. One of the benefits of being human is that we can lie quietly in silence and darkness and entertain ourselves energetically with a whole stream of anxieties and exultations and hopes and plans.

The notion that sleep is caused by fatigue has been thor-

oughly exploded by psychologists who have given special attention to the subject. It is full of obvious difficulties so extreme as to amount to impossibilities. In the first place, everyone knows that extreme weariness may render sleep very difficult. In the second place, if we were to accept this doctrine it would clearly mean that the moment we reached a certain stage of fatigue we would automatically pop off, just as a person shot through the head falls down. Fortunately this is not the case. And thirdly, it would mean that we would awaken as soon as we had recovered from fatigue beyond a certain critical limit without continuing until fully refreshed. The fatigue theory of sleep makes it mechanical and inevitable, and takes it entirely beyond the limits of voluntary control and the influence of the learning process.

To regard sleep as a response to monotony, however, puts a completely different face on the matter. Consider what it explains—why one sleeps best in one's own bed rather than on a softer hotel couch, why the tiny sound of a mouse behind the plaster will keep us awake half the night, why the stoppage of the engines on a ship at sea can arouse so many of the passengers. And it carries us further than this. It shows us that *the art of going to sleep is something we can learn, and that we acquire it by establishing for ourselves appropriate and compelling conditions of monotony.*

Usually we establish our conditions of monotony with reference to the most important rhythm in all man's affairs—the great diurnal rhythm of light and darkness. People who live in the far north, where the summer is one long day and the winter one long night, become excessively irregular in their sleeping. They will stay awake for days at a time and feel no fatigue or annoyance, and they will spend correspondingly long periods in slumber. It is said that prisoners in solitary confinement soon develop most abnormal powers of sleep. But for most of us sleeping is determined by the sequence of light and dark, by the coming of meal-times, and by the organization of our work. It is clear that this is a practice which we learn, and which can be modified by learning.

As you lie in your bed at night all sorts of influences are

playing upon you. There is the dim light which may filter in through your closed eyelids, the rumble of the traffic, the murmur of the wind, the pressure of the bedclothes, the flow of your own thoughts. But they are not insistent, because they are familiar. Their monotony speedily blots them out from consciousness, just as you are unaware of the feel of your clothes or the sensations of your breathing. One by one they disappear until everything is gone. This is the process of falling asleep. The art of sleeping is to prepare a time and a place and an occasion where you will be surrounded by nothing but the most familiar impressions and possessed by none of the most familiar thoughts. Counting sheep is a device far more effective in repute than actuality, for the simple reason that most of us are decidedly unused to counting sheep. A hypnotist works by subjecting his victim to the most regular and monotonous stimuli he can devise. (Sitting in an uncomfortable chair may render a person impossible to hypnotize.) And going to sleep is closely akin to deliberate, planned self-hypnosis.

Sleep rituals are often helpful—nay, they may be necessary. Nearly all of us have them. We can sleep only when the blinds are drawn and the windows raised and the radiators adjusted and the bedclothes pulled up in a most particular manner, or when we have gone through some rigmarole of drinking milk or cleaning our teeth or taking a cold bath. We rationalize these things by saying that they are physically important. Perhaps they are; but their *necessity* is psychological. Even when fantastic they are by no means to be despised. Indeed, it is good advice to tell a person to develop and adhere to a normal and feasible sleep ritual—a certain fixed and perhaps rather meaningless routine which puts his mind to rest. If you have a good sleep ritual which you can use in a pullman berth, or when sitting up on an all-night bus ride, or when the party in the next hotel room has grown rather loud, it can serve you well indeed.

Very efficient and brief sleep rituals, which in the course of time develop an almost magical power of shutting out the external scene and checking the inner whirl of thought, explain

the extremely valuable trick possessed by some of dropping off for forty winks whenever and wherever they wish. I have little doubt but that they can be consciously acquired. Have a routine of action ; have a routine of posture ; have a routine of thought ; have a cultivated and manageable monotony into which you can retire whenever you wish, and you have solved the problem of controlling and compelling slumber.

CHAPTER NINE

GOVERNING YOUR MEMORY

I

You can improve your memory, but the methods often proposed for doing so either will not work at all, or will not serve you economically. You cannot improve your memory to any useful degree by merely practising, by memorizing a great deal. Many years ago a psychologist undertook some very extensive memory experiments. He served as his own subject, and spent patient, toilsome months in learning by heart lists of digits, selections of poetry and prose, and sets of nonsense syllables and words. Needless to say, the work was hard and very dull ; and we owe a great deal to this man's devotion to the cause of science, for he discovered much that is useful and helpful. But out of it all came one conspicuous negative result, which is useful too, for it stands before us as a warning. *He did not improve his memory.* After nine months of toil, during which he learned by heart literally tens of thousands of separate items, he could memorize somewhat faster than at the start of his experiments. But the improvement was not permanent. It soon disappeared when he ceased to work. So here is one method of memory betterment which we know is not worth trying. It would be very foolish for you to undertake to learn a hundred telephone numbers a day just for practice in learning. At the end of three months you would almost certainly be learning your stint of numbers faster than at first. But you would not hold your gains. Whatever

memory may be—and about that I shall have something to say later—it is not like a sort of mental muscle which grows stronger and stronger with use.

Then I doubt whether you would be wise to have much truck with ordinary commercial “memory systems.” Such systems usually consist of jingles, mnemonic devices, and the organization of cues. They are rather crude and mechanical attempts at mental streamlining. Now, it is quite true that many people have found them helpful; but still I cannot recommend them with much enthusiasm. I do not think the benefits they bring can by any means be attributed merely to the systems themselves, and I believe that those benefits can be achieved more readily and completely without them. It is obvious, is it not, that if a man takes his memory problems seriously enough to spend his good money on some such system and to work at it conscientiously when he has bought it, he must have a pretty strong and definite will to learn? And does it not seem likely that this will to learn rather than the system explains the improvement? Then again, a commercial memory system is bound to be mechanical and stereotyped. It is ready made, not made to order for you. Jingles, mnemonic devices, organized cues—they have their uses, but those uses depend upon the kind of material you want to memorize and your own peculiarities as a learner. You can make your own memory system if you understand the principles of learning, and it is likely to help you more effectively than one you buy ready made.

The plain fact is that memorizing well is an art. You cannot reduce it to a set of mechanical rules applicable to all occasions. You cannot acquire it by mere slogging. It depends on certain principles which psychological investigation has made quite clear; and you must understand these principles and find out how to apply them to your own particular problems. Once more we shall see that they all have to do with the intelligent organization of the will to learn. Bring this about and you convert your memory into an efficient streamlined instrument, able to go far and fast on a minimum of power, and capable of rendering brilliant service in the emergencies of life.

But before considering these working principles there is a question to be discussed which may seem a trifle theoretical, and which does indeed have wide theoretical implications, but which is yet of great practical moment: This is the question as to the nature of memory.

II

I have given this chapter the title: "Governing Your Memory." In doing so, however, I flew in the face of some most important experimental findings, for psychologists have shown that, in a very real sense, there is no such thing as "memory" at all. You do not possess one single ability, the ability to remember, which can be used equally well for any sort of material, and which can be trained to serve you efficiently on every sort of occasion. Rather you possess a large number of varied *memory functions* which differ from one another, some of which may be excellent, while others are poor, and some of which can be developed without helping the rest.

An experiment was set up in which the subjects were required to practise memorizing different kinds of material. They learned lists of numbers and nonsense syllables, poems word for word, prose selections word for word, and the sense of other prose selections only. Now, it was found quite possible to improve memory in any one of these departments. But the improvement did not *spread*; it did not affect the other departments. In fact, in some cases it actually hindered. Certain subjects worked for a considerable time on routine operations, such as learning dates, nonsense syllables, digits, and so forth. They showed a distinct improvement in the area of practice. But their ability to learn poems and the substance of prose selections was definitely decreased! Improvement in one respect had a negative influence elsewhere. So specialized is the ability to memorize:

Now, this is very important. A man may be a quick and sure study as an actor, and poor at remembering names and faces. He may be quick at assimilating the sense of a piece of prose, but not nearly so good when it comes to retaining its exact words. He may be able to sit at a conference and a

week afterwards repeat what everyone said and the connection and manner of its saying with an accuracy at which you marvel—and at the same time be forgetful of the detail of a proposed advertising lay-out. A set of instructions given by word of mouth may stick to his mind like glue, and a generalized explanation may slip away from him like water off a duck's back. These are not theoretical possibilities; they are typical cases which may and do occur. Taken together they constitute a warning which we must heed. Whenever we deal with a memory problem, whether in ourselves or in another, we must not think in terms of a general memory ability which operates with equal efficiency everywhere, but rather of a specific job of memorizing.

So the task of governing your memory, of making it an efficient instrument, is essentially a task of rendering more efficient the performance of specific memorizing jobs or types of job. The first step is to make a self-survey, to size up yourself, your situation, and your needs. You find that on certain types of memory jobs you are weak. Just how serious is this weakness? Perhaps it does not matter very much. Perhaps your effectiveness in your business dealings, or your avocations, or your social relationships is not tremendously affected. Then for you the effort to improve may not be worth while. Clumsy as it is, the instrument as you now have it in its present form is adequate to your needs. But perhaps, on the other hand, some concentrated self-direction leading to improvement will pay high dividends. If you could double or triple your efficiency in remembering names and faces, what would this do to your effectiveness as a salesman or an executive? If you could radically improve your memory of the fall of the cards, what would this do to your bridge game? In any case the first stage in improving is to decide what memory jobs you want to do better.

III

Having decided to improve on a certain type of memory job, your business from then on is to apply to it a number of prin-

ciples of efficiency. All of them have been validated by ample psychological research, and taken together they constitute the working rules of the art of memorizing. They can show you how to organize the will to learn with reference to your particular problem, and how to sharpen it in order to get results.

1. First and foremost, *concentrate*. By far the most common cause of memory failures is lack of concentration. Here is a politician to whom a number of people are being introduced. Watch how he behaves. Each time a person is brought up to shake his hand, you would think it was the only thing in the world that mattered to him. In fact, it is. He has trained himself to a point where, for the moment, he simply shuts out everything but this one new personality, his looks, his peculiarities, his remarks, his name, his family connections. And perhaps a month later when he meets him in the street he will secure his vote by being able to address him by name. What do you do in the same situation? Do you give only half or a quarter of your mind to the business? Are your thoughts straying far afield, so that the new introduction makes only a tiny surface ripple on your consciousness? Then don't be surprised if you have forgotten your man's name five minutes after hearing it. And, above all, don't lay the blame to your having been born with a poor memory for names and faces.

This simple principle of concentration—something which we can most certainly learn to control—explains a very great deal about our efficiency in various memory jobs. Consider an experienced and expert secondary school teacher starting in a new position. She knows perfectly well how much depends on the first few days. Hesitation, confusion, ignorance of the lay-out of the building or the general regulations and customs, failure to recognize certain people, inability to identify her pupils correctly, may lead to a bad start from which she will recover only with great difficulty. Experience has taught her what are the essential things for her to know. And on these she concentrates. She is highly organized, with her will to learn very definitely pointed in certain directions.

Or again, the difference between one man who is excellent and another who is weak as a member of a conference or a

committee turns largely upon concentration. The efficient committee member gets a focus on everything everybody says ; the whole course of the discussion is held clearly before his mind. The other man spends half his time day-dreaming or feeling bored. Then, when a new point comes up, the first member remembers how everything previously considered bears on it, while the other is in a sort of daze.

Behind the lens of a cinema projector there is a shutter. This shutter synchronizes with the run of the film, so that as each of the tiny pictures comes into position it is released on to the screen for a fraction of a second and then cut off as it slides away to make room for the next. If the shutter stopped working you would not see a series of clean-cut images, but only a moving blur. This may help to explain how you must learn to use your mind if you wish to memorize well. You must concentrate on the job, so that you have a series of definite, sharply defined pictures, and not a vague blur shading off into all sorts of irrelevancies.

2. Second, concentrate on the meanings and relationships of the material you wish to memorize. *Never try to memorize anything without trying to understand it as well as you can.* Much of the art of remembering depends on making experiences meaningful. Return for a moment to our politician meeting a group of strangers. As we have seen, he concentrates. But this is not the whole story. His concentration has content and point ; it is not just an affair of staring hard and knitting his brows. He asks each person a few questions and seems much interested in the answers. He looks him full in the face and responds markedly to everything he has to say. It may be that he has become so adept that he is not consciously trying to remember the stranger. But his whole emphasis is laid on making the person not just a blur on the retina and a sound in the ears, but a focus of meaningful and ramifying experience. He *places* him in a context of ideas and connections and social and family backgrounds. *He makes him mean something.*

This is what you must do everywhere and always, for remembering depends upon it. Remembering depends on

meaning, even in those very extreme cases where the material with which you have to work lacks all meaning of its own. If you have to learn by heart a series of nonsense syllables, or a series of digits, or an address in a strange city, you should do everything possible to put meaning into them. Learn them in a certain rhythm, and, if there are any concealed rhymes, pull them out and accentuate them; this groups the material, and to that extent renders it orderly and meaningful. Or if there are any associations that occur to you—as for instance the address 22 Warren Avenue making you think of rabbits because of the connection with rabbit-warren—hang on to them no matter how wild and silly they may be. Extraneous, arbitrary, invented meanings are far better than none at all. Indeed, some psychologists have claimed that we never memorize anything if we are entirely prevented from imposing meaning and organization upon it.

This concentration upon meaning is the secret of most great feats of memory. It explains why a bridge expert can tell you every detail of a game he played ten years ago. It is the reason why a golf professional will be able to remember for an incredibly long time every stroke he played in a certain match. When a great chess player can carry on a dozen games blindfold the effort of sheer memory is almost beyond comprehension. And if memory were mere routine it would not only be incomprehensible—it would also be impossible. Such feats as these are possible only because every element in the situation is full of rich meanings and far-reaching associations. From them we can clearly see that to remember well we must *think* while we are memorizing.

3. A principle closely connected with the last we have discussed is that you should learn by wholes rather than by parts. If you are arranging material for a speech or for presentation at a conference, go through it as a whole rather than bit by bit. Do the same thing if you are trying to master a set of instructions, or a scientific principle, or the rules for handling a point of syntax in a foreign language, or learning a poem off by heart.

For several reasons this advice is not easy to follow. In the

first place, learning anything bit by bit seems efficient and business-like. You are, let us say, going to take up a new executive position where you will have to direct a staff of fifty persons. You send to the personnel department for their photographs and proceed to master their names and jobs in advance. If you spend fifteen minutes on a small selection, you will have learned that selection perfectly. But if you simply go over the whole mass, you will probably have nothing but a confused impression in which a few individuals may have begun to stand out. The former seems the sensible procedure, and if left to ourselves we naturally incline towards it. Nevertheless many careful experiments have proved it to be the less efficient. If you will stick to the "whole" method, going over your entire range of material as often as you can in the time allotted, and repeating the process day by day, you will gain two notable advantages. The total length of time you will have to spend to gain a perfect mastery will be less than if you work piecemeal. And you will remember what you have learned more perfectly and for a longer period.

Another reason why we tend to prefer the "part" method, although the "whole" method is more efficient, is that it takes less in the way of intelligent planning. To use the "whole" method you must begin in plenty of time. If you are trying a cram the night before the event, you cannot use it effectively. Of course if you don't much care about efficiency and perfection—if all you want is to be sure of knowing a little something and retaining it very temporarily—then it does not much matter. But this is not good learning. You can use the "part" method unintelligently as a routine and get results of a sort, but to use the "whole" method calls for well-planned strategy and an intelligent distribution of time.

4. The fourth principle I have to state has a strange sound. It is this: Retain and apply the experimental attitude in memorizing. This may seem peculiar and even incomprehensible at first, because we so easily think of memorizing as mere routine dependent on nothing but repetition. *Yet here we have a reason why we so often fail with it.* The experimental attitude, as a matter of fact, has a place in memory work just

as much as in the acquisition of bodily skills. Indeed, it has a place in all good learning.

Let us suppose that you have the job of learning a poem by heart, which may perhaps be taken as a rather routine type of memory performance. How can the experimental attitude apply to the business at all? Well, you are using the "whole" method; and each day for four days you have read the poem (a long one) through three times. It is just beginning to set itself up in your mind. On the fifth day, instead of reading it over again, see how much of it you can recall. This will instantly show up the strong and weak places in the structure so far organized. It is very much like the trial movements a person makes during the acquisition of a motor skill. You can see what will work, and what needs further polishing. Success and failure begin to define themselves. Your attention is drawn to certain specific portions of the poem. And your next repetitions or readings-through will yield far more value because of the experiment you have set up.

Experimentation of this sort is something far more than a mere test to find out how much you know. It serves to guide your further learning. One of the great defects of the ordinary school examination which we have all experienced is that its relation to learning is almost entirely terminal. It is the end of the job, not part of it. But in any memory work you should examine and test yourself as an integral and essential part of the process. During your little conversation with a stranger to whom you have been introduced, make it a point to discover definitely whether you can say his name; and try yourself out with it more than once. When there is a lull in the business conference do not occupy your mind exclusively with the thought of dinner or the evening's entertainment that is to come; rapidly review the course of the discussion and see how much you can remember. In learning anything out of a book, whether it be the actual words of a passage or the general substance of an argument of exposition, always check up from time to time to see how well the process is proceeding. There is a saying that a watched pot never boils, but you should peep into the pot of memory from time to time to see how the

contents are coming along and what needs special attention.

Do not introduce these trial procedures too early in the game, and do not postpone them too long. Experiments have indicated that they will do the most good if you use them when the material seems about half learned. You cannot always apply this rule to every kind of memory work, and even at best it is not very exact ; but it gives you something in the way of a concrete guiding principle. And once again experimentation has established that if you distribute such self-testing experiments through the process of memorizing anything, much time and many repetitions are saved.

5. The fifth principle you must have in mind in making any job of memorizing as efficient as possible is systematically to organize cues and clues. To show you what I mean let us again consider our illustration of learning a poem by heart. You have carried your learning along until the work is almost finished. You are nearly certain that you could get up and recite the poem from end to end. Yet there is one stanza that persistently causes trouble. When you come to it you grow confused. Often you forget it entirely. And you are afraid that under any unusual strain or nervousness it may escape you. What then should you do ? See if you can pick out some striking word, or some phrase of one, two, or three words, or some metaphor or figure of speech contained in the stanza which will cue the whole thing in for you. Given this, the whole business comes back. Here is your working cue. Connect it in your mind with the end of the preceding stanza. And the probability will be that your problem is solved.

This careful observation, selection, and organization of cues is an important element in all good memory work. It is pushed to the limit in mnemonics, which seek to guide and help memorization entirely by the use of external cues. Except in a very few cases this is a mistake. But the principle of utilizing definite cues is absolutely sound, so long as you do not carry it to extremes. Do not try it unless your self-testing reveals that it is necessary ; do not multiply cues just to have a feeling of security. I know people who try to memorize pieces of music in terms of nothing but cues. They will write out the

composition backwards and forwards ; learn just what notes come at the beginning of every line or every bar ; learn the left hand alone and the right hand alone ; and so on, with endless and amazing ingenuity. The point is that they are very much afraid of breaking down, and they want items to cue them in all along the line. What actually happens is that they make the memory process intolerably burdensome and probably diminish rather than increase its safety. For the kind of driving anxiety behind these laborious performances militates strongly against the natural operations of the learning process.

So my advice would be to locate the thin ice by your process of experimental and directive self-testing. Find out where your structure is weak and seems to need a girder or two. And bridge these places by well-planned and definite cues. External devices, to be sure, will never make you a good learner ; but if you are directing yourself sensibly and organizing the will to learn effectively, such devices can be really helpful from time to time.

IV

Practise economy in your memorizing. In all probability you will never have to live on a desert island where works of reference cannot be had, where you possess no paper on which to make notes, and where you cannot look up items you once knew but have since forgotten. Try to make up your mind what memory jobs are really worth doing. There is no doubt that some are. But also there is no doubt that a person can waste much time in such work. The awful example of such waste is unfortunately afforded by the institution specially dedicated to the proper guidance of learning—the school.

This advice to be economical of memory and to use it only where there is a clear-cut advantage may strike you as good, but indefinite. Fortunately, however, the results of scientific investigation enable us to carry it a good deal further. Psychology makes it evident that there are three chief reasons for memorizing anything whatever—to *recall* it, to *recognize* it, and to *re-learn* it. Here we have an idea of great practical value.

1. Some things you will wish to memorize for the sake of being able to recall them in totality and without any aids whatsoever—a poem you want to recite, a part in a play, a speech to be delivered without any notes, a set of instructions to be carried out under conditions of stress and strain. Now, this is by all odds the most difficult kind of memory work. You may be able to name each one of twenty people when you see them in a group ; but to be able to recall all their names without seeing them is an entirely different matter. In learning for recall you should always have very definitely in mind the occasion where the material is to be used. You should fix your attention also upon the length of time during which the material is to be retained, a point discussed at some length in an earlier chapter. You should make frequent and searching self-tests and rehearsals. You should introduce cues which will show you how complete your recall process is—the number of items in your instructions, the number of stanzas in the poem, etc. But, above all, do not use recall memory unless you are certain you need it.

2. A great many other items you will wish to memorize for the sake of being able to recognize them. This is true in the main of people's names and faces ; you want to be able to see the person and know his name, or see his name and remember him from it. When you are studying maps and planning a motor trip you rarely wish for a complete recall knowledge of each detail of the proposed route ; this would mean being able to go through it mentally, rehearsing all the turns, all the highway numbers, all the towns, and the most important mileages. What you want is to be able to drive up to a certain point and then, when you see it, know which way to take. You want to be able to recognize landmarks and road-marks when you see them.

Now, to learn for recall when we want recognition is exceedingly wasteful. Not only is recall learning much more difficult, but also when one has learned anything with this in mind, it sometimes happens that one cannot use it for recognition. A person might memorize the whole series of items needed for the drive from London to Exeter ; but when he got to the fork

in the road at Bristol he might not know which way to take until he had stopped his car and recited the list, beginning at the beginning and going as far as Bristol. The mnemonic for the number of days in each month is a godsend to many of us, but if we want to know how many days there are in October we have to start the poem and go on till we come to the line "All the rest have thirty-one." The mere word October does not bring up the thought "thirty-one days," because we have learned for recall, not recognition. In the same way, if you ask a child what seven times nine is, quite likely he will have to grind right through the seven times table up to "seven nines are sixty-three" before he can tell you.

There are various and sundry special suggestions and pointers about learning for recognition which I can offer in addition to the general principles discussed in the foregoing section. Always learn the recognition in the direction you want it to go. You may be able to visualize a person's face when you see his name, and yet not be able to tell his name when you see his face; and this is because of the order or direction of your learning. Again, in learning material partly strange and partly known, go from the unfamiliar to the familiar. For instance, in learning a vocabulary list in a foreign language it is better to look first at the foreign word and then at its English equivalent than the other way round. In learning the date of an historical event about which you already know a good deal, take the date first and connect it with the event. (This is not in contradiction to the first suggestion made above, for that applies to situations where *both* the items to be connected are unknown.) Perhaps I need hardly say that all the five basic principles of efficient memorizing considered in the last section apply when you are working for recognition; but there is a rather special point connected with the use of cues and clues, for here you often have a chance to create your own cues. You deliver a speech from notes, and the notes call to your mind what you have planned to say. You make jottings in your appointment book which remind you of coming interviews and engagements. Now, there is a very definite art in organizing such cues. You have to learn

to put down enough to help you along and yet not so much that it becomes uneconomical and even confusing. Nothing but experience and a constant critical watchfulness of your own processes can teach you how to organize and utilize such aids. You will probably develop a whole series of signs, symbols, and abbreviations if you have much occasion to use notes for various purposes. And little by little you will find out how much to put down on paper and how much you can safely omit.

3. Lastly you will memorize certain things for the sake of being able to recapture and re-learn them. Perhaps I should not call this a memory process at all. And yet it is closely affiliated with memorizing. Also it is a type of mental efficiency to which most of us pay far too little attention. Perhaps as you go through some material you find it interesting, and yet decidedly not worth while memorizing for permanent retention and indefinite recall, or even sufficiently important to be entered in a note-book or a file. But there is always the chance that years later you would be very glad to be able to hunt it up and use it. And for this you can definitely provide. You can do so by *providing for documentation*.

Whenever you read a book, no matter how trivial, be sure to get the title straight. Notice the author's name; read what he has to say in his preface, and connect it with any information about him you may gather from the title-page, or the advertising on the jacket. Whenever a person tells you something that seems at all worth remembering, do not try to retain only what he says; try also to remember that it was told you by John Smith. The source of the information may stay with you long after the exact details have faded away. These are very definite efficiency processes in learning; they do not cost much effort; they are extremely useful, and yet they are generally neglected. I know an instructor who asked a large group of graduate students in a professional school the title of a chapter they had all read on assignment the night before. Plenty of them knew what was in the chapter, but hardly any of them could identify it by name. Yet no one can deny that documented information—information whose source

is known—is of more practical value than the same information without documentation. If one knows exactly where to go to find what one needs, this may be ample for any practical situation except an instant emergency.

So the practice of economical memorizing is simple enough, at least so far as understanding it is concerned. Decide whether material is to be recalled, recognized, or re-learned, and act accordingly. Add to this the working suggestions and applied principles derived from experimental research, and you will find no small or meagre gain in efficiency when it comes to carrying through jobs of memory work.

CHAPTER TEN

GOVERNING YOUR IMAGINATION

I

THE topic of this chapter is the fancy ; but there is nothing fanciful about it. Imaginative power is a most valuable practical asset. It is the characteristic secret of the supremely successful career. Napoleon was a great general because he broke the fetters of tradition and conceived a new type of military strategy which for a long time no one was able to meet. Lincoln was a great statesman because he had a clear vision of what the American Union could and should mean. Thrift, industriousness, perseverance, and patience have been qualities possessed by many great leaders in industry and finance. But they are not sufficient to explain a Lord Nuffield or a Henry Ford. The eminence of such men has been due to their imaginative vision, which revealed to them new possibilities, new programmes, new modes of organization and action. The work of Edison and Baird has depended on imagination just as much as that of any artist. Newton, Einstein, Charles Darwin, and Karl Marx have set the patterns of human thinking not merely because they were very learned, but because from the stuff of their minds they wove a new texture of ideas and interpretations.

On a much humbler level, too, imagination is the key to success. If you want to write fiction or drama or poetry, this above all is the secret you must learn. The intimate problem of every writer is: *What shall I write about?* The novice is hampered not so much by lack of something called technique, but by an inability to select from the flux and ebb and flow of life appropriate and manageable subjects. And when he ceases to be a novice and becomes a master the essential thing that he has learned is to think of stories or dramas or poems. The painter or the composer finds himself by finding his subject-matter. The advertising man, or the columnist, or the sales manager achieves success not alone by plodding—sometimes, indeed, he achieves it without much plodding—but by this ability to think of new combinations and new avenues of approach to old problems. The executive who can competently run an organization on established lines is far less valuable than the man who can conceive of new patterns of function and new strategies. The hard and conscientious worker is a valuable member of society and is not apt to miss his reward. But if he is nothing more than this he will never stand out among his fellows as the originator of a better advertising campaign, or a new industrial process, or an improved product, or a more effective type of financial organization, or as the author of a novel or a story, or as the painter of a picture, or the creator of a notable cartoon. For all these are the products of the creative imagination. If you hope at all for certain types of success you must train and develop your imagination. It is the imperative condition.

But can it be done? Are not some men born with imaginative power and others born lacking it? Of course, human beings differ from one another in this respect as in all others. Some have ten talents, some have five, and some have only one. *But nobody has less than one.* Imaginative power most certainly can be developed. Even the men most richly endowed by nature, even the greatest geniuses, show in their work a sequence of growth. Very rarely do they manifest their full power at the outset. Their creative gift is nurtured over a period of many years and becomes profounder and more inclusive and

more truly original as time passes. Progressively they discover themselves and discover their *métier*. Even a Shakespeare, even a Darwin, exhibits a sequence of growth, and through his life and work trains and amplifies his imaginative power. And what can be achieved by the man of ten talents can be achieved—in lesser measure, to be sure, but still achieved—by him who has but one. We can all so govern and develop ourselves that whatever of imaginative power we possess carries us farther and faster. We can apply psychological streamlining to our imagination.

The man of genius governs and develops his imagination, which is the secret of his entire attainment, by applying to himself certain psychological principles. Of course he may never put the matter to himself in just this way. He may not be able to analyse just what is happening, and just what influences cause his growth. And, being a person of supremely fortunate and harmonious endowment, he does not have to care. But he feels and responds to these influences and principles, and guides himself by them, even without bothering to formulate them consciously. And, by applying an analysis which modern psychology makes possible, we can get at them and drag them into the light. To do so is eminently worth while. For then we can see how any man can do in his own measure what the great man does with supreme success. We come to see that no one need feel fated to be a mere unimaginative plodder all his days. If you submit to such a destiny, the fault is not with your stars, but with yourself. It is due to indifference, and to a certain feeling of hopelessness and resignation; *but above all due to ignorance as to what you can do about it and how to handle yourself for a better outcome.* Imaginative power can be an asset to you as it has been to many another. You can develop it if you follow the trail blazed by many who have preceded you, the trail the landmarks of which psychology can map.

II

The whole process of building imaginative power turns on developing what is sometimes, and very properly, called

"a bent." One concentrates more and more upon a certain type of imaginative outcome. One develops more and more clearly a certain line of interest and purpose. One organizes the will in a certain direction. To achieve one's highest effectiveness may take years. But at last a man develops a clairvoyance and a fertility of ideas and an awareness of alternatives in his special field that would be utterly impossible for the novice, and that are the amazement of the uninitiated.

Just as our aim in governing the memory is not to build up a general retentiveness which will work equally well everywhere, but rather to increase efficiency in certain specific memory jobs, so our business in governing the imagination is to specialize with ever-growing power along certain definite lines. The fiction writer enormously fertile of ideas in his chosen department may be absolutely sterile in connection with mechanical invention or military tactics. The sales manager who astounds you by the number of expedients he can suggest almost on the spur of the moment may have a mind as blank as the sheet of paper before him when he sits down to try to write a story. The job of imagination is apt to be highly specialized, and with this we must reckon, and for it we must make provision. Perhaps the classical example here is that of Charles Darwin, who late in life lamented that he had absolutely lost all appreciation of poetry because of his years of intense concentration upon science. Such a price we need not pay. But we must duplicate the general tendency. If you want to grow delphiniums you will not invest in a package of mixed seeds. If you wish for a rose garden you will not plant potatoes. So also with the imagination! Decide what kind of harvest you desire. Plant the proper seed in your mental garden plot. And then set to work to cultivate and fertilize and encourage it by every means you know.

There is a price to pay for imaginative resourcefulness and power, just as for any other good thing in life. And the price is that of *giving your mind wholeheartedly to a certain line of interest*. You and I walk for a mile through the city streets; we see a lot of people and a lot of traffic, and that is that. A fiction writer takes the same walk and sees the same sights and

comes home with germinal ideas for half a dozen tales. The reason is that he has been concentrating on a special line until every strong impression he picks up means "story." A commonplace salesman goes through a week of work, carrying on interviews, pushing his product; he sells his quota and is satisfied. Another salesman spends an almost identical week, and when Sunday comes his head is buzzing with business opportunities he has spotted for himself and his firm. One man drives cars and operates wireless sets for years without either thinking or caring about how they might be improved. Another man cannot get his hands on a piece of machinery without being pestered by inventive and ingenious, though sometimes fanciful and impracticable, notions for reconstructing it. Where is the difference? It lies chiefly in the degree and reality of specialization. Ideas do not come to us out of the blue and at haphazard. If we do nothing but sit and wait for them, we shall never do anything but sit and wait. If you want to get a certain station on your wireless set, you do not sit down in front of it and hope that suddenly somehow the broadcast will come in. You hunt through the ether for a certain wave-length. You tune in. The primary business of imaginative development is the business of tuning in.

But where are the dials? Where is the convenient announcement in the *Radio Times* that such and such a programme will be on such and such a frequency? They do not exist in the imaginative realm. This is what makes the undertaking so difficult. Still, some concrete and helpful suggestions can be made.

1. First of all, *don't quit your job when you quit your desk*. If what you want is to make an ordinary honest living, this may be quite all right. But it is anything but all right if you want to develop imaginative clairvoyance. What you do when you are free from the immediate pressure of routine may be the most important thing of all. The great philosopher Hegel during his earlier years was considered a very lazy man by his students. As they walked past his lodgings they would see him gazing out of the window for hours at a time. But he was anything but lazy. His mind was wrestling with the great

ideas which he built into his system of philosophy, and which have deeply influenced all thinkers since his day. His work as a philosopher did not stop when he had fulfilled his fixed obligations as a teacher in the university. Take a leaf out of his book. Carry your job along with you. Treasure and utilize opportunities to be alone. Plan to have such opportunities. They are chances to transform yourself from a *routine* specialist, which everyone who has a job is bound to become more or less, into a *creative* specialist.

But, when you are free from your desk and the round of detailed obligations which your desk symbolizes, do not carry along the whole of your job. Do not carry along its routine. Think about its wider issues. Try to understand it better in its broader relationships. Consider how it might be altered beneficially. What you are after, what you should cultivate, is the free and unimpeded flow and action of the mind. The proper use of considerable periods of free time is one of the great secrets of many an imaginative success. Some authors set apart certain hours each day when they will concentrate upon their business, without intending to write a single line. You may not need to be quite so business-like. But you should understand that these men are giving effect to a valid and essential psychological principle which you also must respect and apply.

2. Get as clear an idea as possible of the nature and outline characteristics of the imaginative constructions in which you are interested. National magazines will usually reject about ninety-nine per cent. of all fiction submitted. This sounds very formidable, and seems to suggest extreme editorial prejudice in favour of established names. But editors will always insist that they are only too delighted to find a new man who can write printable stuff. And when one reads the fiction output of the magazines or attends the cinemas one certainly does not get the impression of any surplus of good stories floating around. What, then, is the trouble? Perhaps seventy per cent. of the stuff that comes in is not even literate. And of the rest, fifteen or twenty per cent. may be well enough written, but *will not constitute stories*. A short story is a pretty definite

pattern. Very roughly and briefly it amounts to this. Certain clearly defined characters are introduced and presented in a clearly defined situation with respect to one another. Out of this emerges an increasing tension or conflict. And the story consists in developing this tension or conflict to some sort of feasible solution consistent with itself, consistent with the characters, and interesting or satisfying to the reader. Now, the novice is very apt to ignore all this. He writes up a bit of description or an incident or episode, and thinks he has a story. The successful writer, on the other hand, has disciplined his imagination to this particular pattern. This is the shape into which his mind has been trained to flow. This is the kind of thing that comes into his head when he thinks about fiction or picks up a suggestion for a story. It has become second nature to him, and enables him at once and almost without consideration to select what is relevant and usable and to reject what is irrelevant and useless. The novice fails to sell because he has not shaped his imagination to a proper pattern. The expert essentially sells his well-governed imagination.

I have discussed the writing of fiction because it offers one of the best and clearest illustrations of a most important point in imaginative development. But the principle applies everywhere. Just as the novice in fiction can benefit by being told orally or in print what kind of a thing a story should be, and by studying and analysing other people's stories, so the salesman can benefit by reading and discussing and comparing to find out how a sales interview or a sales campaign ought to go, so the executive can benefit by studying the principles of management, so the business man can benefit by understanding the natural laws of finance, so the soldier can benefit by mastering the principles of tactics and strategy. Always the aim must be to set up a pattern, to imagine an organized, feasible, and coherent result.

Remember, however, that any explanation in words alone is but the ghost of an explanation. You yourself must set to work to clothe it in flesh and blood. Not until you feel the rightness of the right way, not until you have built it into the very texture of your mind, have you achieved imaginative

power. But still a verbal description of what you are after can be a great help ; it can conserve your time and strength ; it can lead you away from blind alleys ; it can give you a critical standard which becomes more and more effective as you work ; and it can save you from despair.

3. Cultivate the note-book habit. The great difficulty in the proper and effective development of imaginative power is that everything seems so vague, particularly at first. You are apt to feel like an aeroplane pilot in a fog, who loses all sense of direction, and who cannot tell whether he is climbing or dropping or even whether he is flying right side up. To some extent this is inevitable. Much of the earlier work in developing and guiding the imagination is blind flying ; and, like the pilot, you need instruments. Now, the note-book is something definite. In it you can see your ideas take concrete form and begin to come together and coagulate and grow. It is a clue, and a stimulus, and a challenge.

You are, perhaps, a salesman. Very well. Try this suggestion. Begin it to-day. Set up a note-book, or better still a card file. Use $3 \times 4\frac{1}{2}$ cards which can be carried about easily, and always keep some in your pocket. Whenever any suggestion comes to you in regard to your business, whether from reading or conversation or meditation or dreaming, jot it down on a separate card or a separate page of the book. Once a week or once every two weeks go over every suggestion you have caught and put on paper. Take plenty of time about it. Give your mind a chance to ramble and explore. See if there is anything you can follow up ; see if any brand-new suggestions occur to you ; and write down anything that comes. Keep this up systematically for a year. By that time several things will probably have happened. First of all you will have accumulated a good deal of stuff that looks like junk, but do not be discouraged about this. Do not throw it away. You never know when an idea may come like a flash of lightning and run zig-zag through such a mass of material, and fuse it into a compact and effective unity. Rubbish-heaps have been suddenly transformed into gold mines before to-day. Then among the chaff you will almost certainly have collected a goodly

number of grains of wheat. Without the use of a system you would have missed them. And remember that it takes only one really good suggestion to multiply any man's effectiveness many-fold. Lastly, and most important of all, you will have given yourself a certain slant. You will have trained yourself to be always on the look-out for new notions, new combinations, new and valuable thoughts. And, after all, what can we mean by the governing of the imagination except this ?

The exact detail of what I have outlined may not fit your case. A note-book kept for the purposes I have suggested must and should be a highly individual possession. What suits your personality and work might not be at all the thing for somebody else. But it is the principle, not the detail, that I want to present. Do not just hope for good ideas. Go out and try to scare them up. A hunter may spend a day in the woods without any luck. But if he only sits in camp or wanders around unobservantly he has weighted the dice heavily against himself. He does not even deserve any luck, and probably will get his deserts !

III

So far we have been considering how to develop imaginative power over a period of months or years. Our point of view has been that of the survey, taking in a wide range of territory. Now we are to move up closer and try for a more detailed picture.

You are considering some definite kind of imaginative undertaking. You wish to create a story or a play or a poem ; you want to build a new type of sales approach, or a sales campaign, or an advertising lay-out that must have definitely novel features ; you are interested in mechanical invention, or in thinking of some new kind of game which you hope may have commercial possibilities ; or perhaps your aim is an altogether more modest one, and has to do with concocting some original type of party or entertainment for your friends. In any case, you have before you the same general problem ; you are facing a job for the imagination. How will you set about it ? How

do human beings manage to think of new things that will work ? What is the technique of originality ?

Of course no one will present you with an infallible formula that will guarantee original and effective outcomes or make invention sure. But that a fairly distinctive and extremely helpful technique of originality can be formulated is quite evident from studies that have been made of the psychology of genius. Men of genius, working in many fields and in diverse manners, have fashioned, every one for themselves, certain procedures for the direction and government of the creative imagination. There are great differences among them, to be sure ; and there remain regions of deep and baffling mystery where the mind's workings cannot be traced. But still it is possible to glean a few directive principles which, though simple, are extraordinarily enlightening, and which ordinary mortals like you and me can take over and practise to our very considerable benefit.

1. First of all most works of imaginative construction have very definite starting-points. Many a great piece of music has begun with nothing but two or three notes or a simple rhythm. Many a masterpiece of literature has come from a chance encounter or a few casual words or a sight seen for a moment on the city streets. The characteristic origin of imaginative creation is the everyday, apparently casual experience. The man of genius picks up hints from here, there, and everywhere. If we could catch them at their moment of arrival they would seem a motley collection of rag-bag odds and ends. But they are points of growth. Sometimes very slowly, sometimes very swiftly, ideas and images and thoughts coalesce about them. And it may be that when the final work emerges they are relegated to a place of complete insignificance or transformed beyond all recognition or dropped out altogether.

What can we learn from this ? Surely it is clear. *Seek for definite and concrete starting-points for any imaginative undertaking.* Do not let your mind wander helplessly over the entire universe hoping for something to turn up. Do not vaguely want to make a discovery, to be visited by a new and relevant idea. Be business-like. Start a process of directed

and determined search. Every day and every hour a thousand experiences, great and small, press in upon you. Each one of them may be a pregnant hint if you will let it. Do not look only with your eyes or hear only with your ears. Look and see with your mind. Remember James Watt watching the kettle boil and developing from that commonplace experience the principle of the steam engine. Remember Isaac Newton seeing the apple fall, connecting the sight with the problem that was haunting him, the problem of the moon's orbital motion about the earth, and building from this slender and accidental foundation the law of gravity.

You want to write stories? Then train yourself to watch constantly for characters and situations, for these are the points at which most stories start in the creator's mind. You want to draw cartoons? Then be on the alert for the words of politicians, for chance-heard remarks, for sights seen on the bus or while you drive your car. You want to plan sales campaigns? Then scan with a creative intent all the advertising you see, and observe the methods and demeanour of the assistant when you make a purchase at the neighbourhood shop. You wish to be an inventor? Then have mechanical devices on your mind, whether there are any immediately present to the eye or not.

You must set yourself to coax ideas. You must poke about to unearth them in their hidden lairs. This is where the note-book habit which I have already recommended can help you enormously, for it forces you to focus on the great source of germinal ideas which is nothing other than everyday experience. If you were supported in thin air it would be almost impossible to make a long and successfully directed jump. For that you need a solid footing, a place from which to take off. So also with your imagination. The first stage of imaginative construction is to find some solid, concrete point from which to start. In itself it may be trivial. It may seem exceedingly remote from the business in hand. Once you have used it you may never return to it again. But it is very necessary.

2. Then, as the work goes on, practise and cultivate the art of *imaginative experimentation*. Your story is to contain a girl

and two men. Try every variant you can conceive in regard to each character and in regard to their relationships. Are they young or old? Married or single? Rich or poor? Handsome or ugly? Force yourself to ask as many such questions as you can. Write out a long list of them and consider all possible answers one by one. This example from fiction illustrates a principle which applies everywhere to all imaginative undertakings. Consider every conceivable combination of circumstances for your sales campaign, or your administrative set-up, or your prospective party. Never mind if some of them seem silly or impossible at the first glance. It is not the first glance that counts. Maybe a wild notion can be tamed and made to do good work if you do not reject it too soon.

It is in this work of imaginative experimentation that knowledge and experience count for most. Some people have supposed that knowledge has nothing to do with imagination, and that mental creation means making something out of nothing at all. Now, to be sure, dead knowledge, pedantic knowledge, may be the foe of imaginative construction. But living knowledge, knowledge that has been assimilated and is part of you, is its vital substance. Scott was steeped in the history of the times he portrayed in his novels. The author of *Anthony Adverse* spent years in laborious research. Darwin's fund of scientific knowledge was encyclopædic. H. G. Wells has read enormously in sociology, biology, physics, history, and many other fields. These men quarried the material for their new constructions out of the hard granite of facts. Their inspiration was founded upon toil.

Very often the novice makes the mistake of supposing that creative work has no relationship to hard and exacting and accurate labour. And it is fatal. One cannot think well about any subject unless one knows it well. Without knowledge, alternatives simply do not occur to one, or arrive in a measure so meagre as to be almost worthless. Truth is not only stranger than fiction; it is infinitely richer. Facts are always the best possible prompters of ideas. So if you find yourself stuck for new ideas, turn to facts. Here is your best chance of finding new expedients, new lines of action, new modes of

treatment. In an experiment made some years ago there was found to be a definite relation between the amount of knowledge people possessed and their ability to think creatively and originally. And all that we know of the mental workings of men of genius confirm the conclusion. Shakespeare lifted the material of most of his plots from old records and tales. Many a man whose work has seemed to have the sweep and inspiration and freedom of a gift from on high has based his achievement on endless patient hours of grubbing through the driest and dullest of material.

3. Whenever a job of imaginative construction has begun, try your very best to finish it. You may not be able to make it very successful. But push it through to a conclusion of some kind. Do not leave it hanging in the air. Write your story, even though you know that it is unsatisfactory, even though you tear it up the moment the last page is completed. Even though you know that your sales plan will never be given effect, put it down on paper in full detail. Even though the grand new scheme for your party will never be tried out, develop it in full and get it into black and white. *This* job may be a failure, but perhaps the next may succeed—or the next after that, or the fifth you try, or the tenth. You are building for the future. You are developing powers within yourself. And the definitive completion of a piece of work has a most beneficial effect. Half-baked bread is bad for your stomach ; and half-baked projects are equally bad for your mind.

It is said that when Fanny Hurst was a new writer she had a single story accepted, and then eleven rejected one after another. Now suppose that instead of writing out those eleven failures she had decided to spare herself much effort and just think them over, hoping that finally a better one might come along ; What would have happened ? Would she ever have developed into a success ? In all probability not. Of course, she was under a special incentive, because all along she was trying to produce a product that she believed might sell. But the discipline was enormously beneficial—in fact, it was essential. So finish out all your work as faithfully and fully

and carefully as if you were quite sure of its immediate acceptance and application. This also is a most important element in the effective government and development of your imaginative powers.

Such, then, are the leading suggestions which psychology has to offer for imaginative self-direction in any and every field. They may seem almost oddly business-like and concrete. Yet inspiration is a business-like and concrete affair. The aeroplane must be solidly and scientifically built if it is to soar. And these principles have been proved in practice. They show you how to develop originality, which also is a product of learning. By these means you can fashion your imagination into a streamlined, swiftly moving instrument, economical of power, capable of most valuable service.

CHAPTER ELEVEN

LEARNING TO THINK EFFECTIVELY

EFFECTIVE thinking does not depend much upon logic. Logic may be useful in testing its results ; but the trick is to get the results in the first place. And no formula, no fixed sequence of mechanical procedures, will give it to you. When psychology gives us a peep into the mind of the swift and brilliant debater, the solid reasoner, the man who can solve problems like a flash of lightning, we are amazed at the hit-or-miss quality of its operation. First-rate thinking is apt to be as chancy and erratic as artistic creation. It seems to defy all the rules of the text-books on logic. Instead of beginning at the beginning, it often starts with a conclusion whose rightness is sensed long before it can be proved. It may even start with an idea that is absolutely ridiculous and untenable, and arrive at a solid result by showing why that idea cannot be entertained and what the consequences of rejecting it must be. Certainly it is no plodding business of building up a neat sequence of syllogisms. Logic is a science ; effective thinking is an art.

The first essential rule that psychology can give us for effective thought is *the rule of broad experience*. If you are constructing a high building you will be wise to put it on a broad basis, just as the skyscrapers of Manhattan are built upon the broad and solid foundation of the living rock. So if you are to put together a firm, well-knit, valid structure of thought you must raise it on a wide area of varied experience.

What is the most common reason why men do not think well? Simply a dearth of ideas. They perhaps have minds capable of thought, but they have nothing to think about. This is just as futile as having a factory capable of turning out a million cars a year, but no raw materials.

Where do ideas come from? They come from facts, and our contact with facts. Here is the grist to feed to your mental mill. Suppose that an engineer confronted with a very difficult problem in the building of a bridge should come to you for advice, could you help him? Probably not. You may have a very good mind—a mind that does certain things extremely well. But with this problem you are helpless. All you can say to him is: "I really don't know what you ought to do." You have no resources from which to draw. You have no fund of ideas. You may rack your brains for hours, but it will be like trying to squeeze blood from a stone. The blood must be there; otherwise all the squeezing in the world will never yield a drop. Probably you could learn to be a good enough engineer—a good enough thinker about engineering problems—to solve the difficulty. But it would take time. You would have to dig into facts. You would have to accumulate experience. Most of the great detectives of fiction, and *all* the great detectives of real life, have been men of wide and varied experience. For years they have fed their minds with the solid stuff of factual contacts. Then when an emergency comes along they have not merely a rush of blood, but a rush of ideas to the head.

Let us suppose that you are up against the problem of devising a filing system for an intricate and unusual type of business. Here is a straightforward and unmistakable challenge to effective thinking. And the proper starting-point will

be an ample, varied, and complete experience of every aspect of the business. Do not allow yourself to be hurried. Familiarize yourself with the work of every department and every division. Do not rely on written reports or conferences. Sit in with the various types of workers—the clerks, the salesmen, the accountants—and if possible share their activities. In your own person get the feeling of the entire concern in all its aspects. Your task is not merely to draw up something that looks neat on paper, but to elaborate a practical working scheme. You are like a reflector which brings together rays from many sides, and concentrates them all in a single beam.

Failure to provide a basis of broad experience is by far the commonest cause of inept and silly thinking. The average high-grade professional man has absolutely no notion of the working problems of a trade union ; and when he presumes to give advice, even though he may be blessed with excellent brains, his words strike a union leader as childish. The average skilled mechanic can throw little light upon the complicated questions of business policy which confront the “ big boss,” not because he is an inferior person, but because he has not direct contact with such matters.

All this may seem obvious. Indeed, when it is put into words it *is* obvious. Yet in practice men do not find it so. It culminates in a most important and valuable rule of life. *Whatever your field of endeavour, always seek the widest possible range of contact and experience if you hope to think effectively in that field.* There is a disastrous notion abroad in the world that the only practical person is the narrow specialist. Have nothing to do with it. Everything that psychology has to teach us about thinking shows that it is false. Organize your life for wide experience, even if you have to sacrifice immediate results. Never mind if some of the experience does not seem relevant to the immediate problems of your job. Light from remote stars comes to the earth at last. And a contact in a seemingly irrelevant field can give you just the idea, just the solution you require in your hour of need. Read widely about your business, but do not confine your reading to your business. Books and magazines are magic carpets on which you can

explore the whole wide world and view the human scene. Read for entertainment by all means, but not just for entertainment. Think and feel your way into what you read, and let it have the quality of experience.

Then as to human contacts. Do not confine your associations to the people in your own department. Explore the whole range of the business with which you are connected, as well as you can. And outside business try to organize contacts with people in quite different walks of life. Do not despise hobbies. They may be valuable for their own sake, and still more valuable for the new human associations they bring to you. Many a business deal has been consummated or started on the golf course. But this is not the kind of thing I have chiefly in mind. From an avocation and the contacts it involves one can gain knowledge and outlooks and understandings that may serve one excellently well.

Do not, however, just shovel experiences in wholesale and let it go at that. The first attempts to convey instruction by means of films ran into a serious and unforeseen difficulty. It was found that people would be very much interested in watching a process thrown upon the screen, but that when the film was over they knew very little about it. Everything went by so fast that nothing was firmly grasped. And the watchers tended to take a purely passive attitude, the attitude of an audience present for entertainment. Many a sailor, many a tramp, has beheld the spectacle of human life in a sweep of surpassing breadth and variety; but it does him no good. He does not reflect about it or organize it in any coherent way. He has experience only in a very partial and limited sense. For complete experience is not something that we *have*, but something that we *make*.

By all means see and hear and read all you can. But do not stop there. Reflect about what you see and hear and read. Ask yourself whether it has any possible relationship to your central core of life interest. Be sensitive to the faintest, most fantastic whisper of suggestion. Digest and organize. Do not create an intellectual lumber-room. Continually arrange and re-arrange the furniture you continually bring into your mental dwelling.

Two characteristics of many an effective thinker are these : He is *fertile* and he is *swift*. Both these qualities he owes largely to the range of his experience and the excellence of its organization. Presented with a problem, he thinks of many possible alternatives, but he does not conjure them up out of a void. No one can do this. He has seen and heard and read many things and reflected about their relationships and significance, and so he has many starting-points, and can line up a dozen suggestions where an ordinary person will think of three, or two, or one, or even none.

Then watch him in a sudden emergency, perhaps in a conference where a problem is abruptly thrown at him. Immediately he is able to give an answer or a counter-argument. It comes from an acquired mental richness set out in a well-planned, intelligible order. Quickness other than that of the snap-judgment depends on broad experience.

Of course there are excellent thinkers who must work slowly. If you ask them a sudden question about a new point their first reaction is : " I don't know." But give them time, and you will have a splendid and adequate analysis. And they are extremely useful members of society. If one can really work out a first-rate idea it usually does not matter tremendously whether it comes in an hour or a week or on the spur of the moment. But the slow thinker who is also effective works always by the mobilization of mental resources and wealth, just as truly as the rapid thinker. Mental resources and wealth he must have.

Moreover, if you have reason to regard yourself as a slow thinker, if ideas do not come to you readily in emergencies, do not accept it as a sentence for life. You can organize yourself for speed. You wish to be able to make prompt and valid contributions when you are in a conference ? Very good, here is the way to set about it. Enrich your mental resources relevantly to the matters considered in your conference. Stock your mind with as much completeness and variety as you can manage. And organize and point everything up with particular reference to the conference. I doubt very much whether good thinkers are *born* either slow or fast. They become slow

because they are in situations where speed does not matter, and because they set up techniques which slow them down. And they may become fast, if it is worth while to do so, by organizing the content of their minds for challenges which demand speed, and by alterations in their mental technique.

II

The next rule for effective thinking may be called *the rule of centring*. You must define the exact nature and bearings of your problem. A vague difficulty is an insoluble difficulty. *A problem well defined is half solved.*

Let us return to our illustration of devising the novel filing system. You have spent considerable time in acquainting yourself with the various aspects of the business. You have made many contacts and assembled a wide range of experience. Perhaps some people think you are moving much too slowly. Really you are not, and now the moment has come to prove it. You sit down at your desk with three very necessary items of equipment—a pencil, some paper, and a liberal allowance of time—and you set to work thinking out and jotting down exactly what the filing system must accomplish. You consider every possible point and difficulty. You allow—nay, you force—your mind to wander over every suggestion and alternative. You write down some things that turn out to be quite irrelevant or impossible. Some of your sheets you throw away, and others you re-arrange. Little by little your notes coalesce, and your ideas along with them. Finally you have a clear picture of what your filing system must do.

This careful organization of the essential point of the problem is a most necessary element in effective thinking. It arises out of and pulls together the wide range of concrete experience on which I have insisted. We find it everywhere. A man planning an advertising campaign must determine the nature of the product to be sold, the type of service or value it can yield, the characteristics of the public who are the prospective buyers, the sort of medium that will exploit it best, the probable cost, and so forth. His slogans, his lay-outs, his lists of sales argu-

ments are not evolved in a vacuum. He collects his ideas from here, there, and everywhere, and centres them as definitely as he can. The physician arriving at a difficult diagnosis follows the same general lines. He brings to bear a wide range of experience. As he explores the patient's symptoms this narrows down more and more to a focus. At last, instead of a fog of vague guesses, he has one definite and crucial question. Solving mathematical problems is yet another illustration. It has been shown that when children in school are asked something about the meeting-point of two trains starting from termini a certain distance apart and travelling at different speeds, one reason why many of them fail is that they do not clearly define the point at issue, and so do not see how to go to work.

That is what the centring process must do. It must give you a working plan as you seek for a solution. And intellectual centring is an art that you can learn. I say this with confidence because much of the best teaching nowadays in science and mathematics turns precisely on showing people how to define the point of problems. It works in school. And what will work in school will work outside also, for the learning process is always the same. The only trouble is that you will have no teacher and no well-organized text-book to help you in the complex problems of living. Still, as I say, the same principle holds good.

I have spoken of pencil, paper, and time as very necessary items of equipment in this centring process. Let me elaborate a little on this statement. Pencil and paper are necessary—or, if not necessary, then for most of us extremely valuable—because they bring you right down to cases. You can sit and day-dream by the hour without any definite result at all. Your mind just runs on from one thing to another. But this is emphatically not what one would call effective thinking. Perhaps one should hardly call it thinking of any kind. But, as soon as you have to write something down, ideas crystallize. And, besides this, associations begin to suggest themselves—associations that are not just vague ramblings, but definite, relevant, useful. I know an advertising man who struggled

for weeks to find a good slogan, and got it in an hour when he sat down and began to make jottings.

Some people adopt another device for the same purpose. They talk out their ideas to another person—almost anybody will do. What they want is not reactions, opinions, and criticisms, but just a chance to put things into words, and to give form and shape and place to what is vague and floating and intangible. In general this is not such a practical method. It is apt to be a little hard on the auditor. Pencil and paper are much more available, and they will not become bored. But here again we clearly see what is necessary. One must centre down; one must have something concrete; one must define the heart and essence of the problem. The particular technique you use is not very important. The process itself is absolutely necessary.

Then as to time. This, too, is important. I am quite convinced that many people never become effective thinkers for the almost childishly simple reason that they never take the time. They have plenty of time for cards and golf and gossip and domestic wrangles and going to the cinema. But it never seems to occur to them to set apart an hour to wrestle with a problem. They act as though thinking were something that just happens, instead of being an art that one learns.

Now the centring process takes time. It is, indeed, perhaps the most difficult part of the whole business of thinking. It is what turns feeble day-dreaming into effectiveness. Don't say "I wish I could sell old Jones a bill of goods," or "I wish I could think of a good advertising slogan," or "I wish I could solve this mathematical or engineering problem." At any rate, don't say such things and then stop short. So far you are not thinking at all. You are only wishing. The will to learn must concentrate far more definitely than this before it can do you any good. If you go no farther you condemn yourself to ineffectiveness in thought. Go a step farther. Define to yourself the hub of the difficulty in selling the goods, or working out the slogan, or solving the problem. That is what you have a mind for. That is the way to use it. Take the time to do so.

III

You have defined your problem in the light of a richness of experience which gives it significance. You have discovered what to think about. And now the scene shifts to a consideration of possible solutions. Above all, do not jump at the very first solution that seems to fit the situation. Even if it appears to be an excellent one do not neglect to consider others also. One of the faults of much thinking is a too early fixation, a failure to preserve an open mind. Always it is tempting to push hastily towards what looks like a final result, always it is hard to keep matters in unsettlement ; but this is very necessary if you want the best possible outcome. What you want is not *a* slogan, but *the* slogan ; not *a* policy, but *the* policy ; not *a* filing system, but *the* filing system. The difference between the first-rate and the second- or third-rate thinker very often lies in his refusal to be too easily satisfied or rushed into a final judgment, in his patience with exploration and continued searching. A definite factor in learning effective thinking is to learn the art and wisdom of persistent hesitation.

There are three chief influences which can help you here, and which you should summon to your aid. The first of these I have already discussed at some length, so I need not say much about it here. I refer to the wealth of ordered experience which is the background and basis for all effective thought. The man of meagre experience is peculiarly liable to snap judgments. Indeed, it is almost impossible for him to avoid them. *He cannot think of many alternatives.* And when something feasible occurs to him he grasps at it with inward thankfulness, and is rather apt to resent any attempt to show that it is imperfect.

When you have defined your problem, mobilize afresh your whole background of relevant experience. Try to have your mind ramble freely. Open it hospitably to any and every suggestion from whatever source. Do not let yourself fall so desperately in love with any one idea that you cannot think of any others. When some solution to your problem has suggested itself, make a note of it, try to forget it, and then try to

think of another. Deliberately begin at an entirely new point. Hunt about for clues and leads, and follow up any that present themselves. Remember that as a matter of fact there is always more than one solution to any problem. Once it was thought that the physical universe could be explained by the laws of motion and gravity ; but along came Einstein and offered an entirely new solution to the vast puzzle. Once it was taken for granted that parallel lines never meet ; but now we have systems of geometry in which parallel lines come together at a finite distance. Once natural selection was accepted as answering the question of how evolution took place ; but now many biologists believe that our explanation must be very different.

Learn from these great dramatic sequences of human thought how to manage your own comparatively limited thinking. You have before you a solution which seems to be fairly good, or more than fairly good ; but perhaps by changing the entire basis of the discussion and approach you can get a much better one. Make it a point to try.

Then, secondly, you can postpone finality in the interest of effectiveness by being willing—nay, eager—to consider objections. Some people are unwilling to entertain objections to their pet ideas out of intellectual pride. Others again adopt an attitude of hostility because they wish to preserve their prestige or the dignity of their positions in the world. Many an executive who is setting forth a new plan expects nothing but compliance from his subordinates, and waxes indignant over criticism. This may or may not be good discipline in an organization. But as a thinker a man ceases for the time being to be an executive or an official, and becomes merely a person using his mind. And if he wants to use his mind to the best advantage he will positively welcome difficulties, objections, negative reactions, and criticisms. He may not accept them. After consideration they may seem to him worthless. But if he is wise he treats them not as insolences, but as challenges, whether he admits as much to the objectors or not.

If you cannot get criticisms of your ideas from other people, seek for them yourself. Try to think of every objection that

can possibly be urged against your slogan, or your policy, or your filing system. Heap them all together, whether at first they seem trivial or important. You can never tell how far a seemingly trivial difficulty will take you if once you begin to follow it up. Write them down and think them over. Do all you can to lengthen the list. The point is not merely, or at this stage chiefly, that you want to check up on your solution. The point is that you are looking for starting-points from which to build other solutions.

Thirdly, you must have adequate technical resources if you are to build up a flexible and far-reaching range of alternative solutions. You must have a mastery of your medium. The reason why many secondary school and university students fail with mathematical problems is that they are not sure enough of the basic operations of addition, subtraction, multiplication, and division. They do not really know their business. And the only kind of business about which you can think inventively, flexibly, and effectively is the business you know. An outsider may come in with an occasional brilliant and novel suggestion; but it takes the expert to assimilate it, and to envisage its values and limitations, and to think of possible modifications and alternatives.

There is a strange and strangely common idea that able and original thinking can be carried on without technical mastery of the field to which that thinking applies. All that we know indicates that the very reverse is true. The effective thinker is likely to be the most systematic, the most thorough of persons, the man most sensitive to any technical deficiencies in himself and most anxious to correct them. It is only the man who really does not know what thought means and how originality is attained who excuses a lack of expert facility in himself by saying that he has a mind above detail. The executive whose life-long habitat has been a mahogany office is far less likely to think of feasible alternatives than a man like Samuel Vaucain, lately president of the Baldwin Locomotive Works, who was able to go out into his shops and make an entire locomotive with his own hands. A man of wide general business experience who knows how to centre down upon

essentials may be able to think of excellent methods for a filing system. But unless he supplements all this with an expert knowledge of filing there will most certainly be a weak point in his equipment which may easily show up in his results.

Here is where specialization enters our account of thinking. In order to think effectively one must be far more than a specialist. I would sooner trust an able amateur of wide general equipment than a narrow expert. But still I would know that the ideal combination is that of wealth of background with precision of equipment. The intellectual machine needs weight and bulk behind its thrust. It is here we find the most common lack. But besides this it needs a finely tempered cutting-edge.

IV

The ultimate stage of effective thinking is the formulation of the final solution *and its verification*. Do not neglect the latter. Fifty years ago writers on scientific method commonly suggested that discoveries are made and natural laws formulated by a mass of rather hit-or-miss experimentation. How profoundly this view has been changed you may see from the recent statement of a most distinguished physicist that no experiment is much good unless it arises out of a significant theory. Thus a major purpose of experimentation is to check back upon theory. No theory unchecked by experiment is adequately established. No experiment out of touch with reflective thinking is worth performing.

So always make a point of experimental verification. When you have your slogan, do not stop short with contemplating it in æsthetic rapture. Mimeograph it and have it criticized by a hundred or a thousand persons. When you have your policy, do not love it with such ardour that you feel driven to apply it instantly on the largest scale. Select some small unit for a try-out, where not much harm will be done if things go wrong. When you have your filing system, set it up and operate it all by yourself for a week or two before establishing it. Such advice has an obvious sound, and yet failure to

observe it is one of the common infirmities of thinking. We are so eager for results, so pleased with our pretty solution, that nothing will do save giving it instantaneous effect. But, if we wish to learn effectiveness in thought, we must restrain our impulses and increase our caution. We must emulate the first-rate scientist who refuses to publish until he has made assurance doubly sure, but whose final utterance has an influence more far-reaching than the copious outgivings of a hundred glibly brilliant souls.

CHAPTER TWELVE

MASTERING AND USING LANGUAGE

I

LANGUAGE is the most useful and important general-service tool that man has ever devised. A breed of dogs with brains as good as those of human beings would still be under an enormous handicap if their vocal apparatus would not permit them to develop a rich and finely differentiated speech. They would not possess the means for handling ideas ; and a creature which cannot handle ideas can hardly be said to have them. Many a member of a primitive tribe has as much brain as his civilized brother. But if his speech consists of a few hundred words, each one of which may have from a dozen to eighty different meanings—a condition actually to be found—he will not be able to think so well. A child with the potential intellect of an Einstein would probably seem like a moron if he were brought up entirely without a command of language.

Language is not only the agency by which we communicate with other people ; it is also the most important agency by which we develop something to communicate. An immense amount of our thinking and imagining and recognizing and remembering depends upon words. We feel that we do not “ know ” a man or a mountain or a botanical specimen until we know their names. And quite a good deal of our mastery of any technical field depends on our mastery of its special

vocabulary. A person who can only refer to the carburettor of his car as "that funny-looking bulge over there" is not likely to be a good mechanic and still less likely to make any important automotive inventions.

Thus few types of effectiveness are more worth while acquiring than a mastery of the resources of language. The man who can read well and write well and speak well is in a favourable position to think well and to make his thoughts effective by communicating them to others.

Considering the importance of this subject it is only natural that psychologists should have devoted much attention to it. So indeed they have, and the broad results of their investigations are quite startling. First of all they show that most people are quite inept language-users. When they try to read they may catch the general sense, but their impressions are very inaccurate and their speed slow. When they try to write they express themselves inaccurately and weakly, partly because they use only a few words and partly because they are unable to do a good job of sentence construction. And little experimental proof is needed of the prevalence of feeble speaking. But there is a credit as well as a debit side to the account. For an intelligent person can improve his language masteries with surprising speed. He can most certainly learn effectiveness in reading, writing, and speaking if he wants to, and will take himself properly in hand. There must be a will to learn. And that will must be organized according to certain rules and principles which are by no means hard to understand. If this is done you can assuredly achieve streamlined efficiency in your language processes, so that whatever power you have is put to its most advantageous use.

II

If someone told you that you could not read you might feel rather offended. Of course you can read! You began to learn how very early in life, and by the time you entered a secondary school you were thoroughly proficient. But that in itself is a damaging admission. For it has been found that

most people make good progress in reading up to a point and then stop short. Yet your need for skill in reading is far greater than when you were at school. Improvement in this use of the language tool would almost certainly repay you richly. Thomas Carlyle once said that the only way to educate a person was to teach him to read and then let him alone. Of course this is an exaggeration. But do you not know many people who think one cannot possibly master a subject without taking at least one "course" in it? And may not a reason for this be that they cannot read well—cannot dig the stuff out of books and reports—and have to be told by word of mouth?

What do I mean by saying that you may not be a very good reader? Several things, all of them important. First I mean that you may read a paragraph or a chapter and then not be able to tell in detail what you have read. It is amazing how many people will show the gravest weakness when put to such a test. For instance, a passage was given in which occurred the following statement: "You need a coal range in winter for kitchen warmth and for continuous hot-water supply, but in summer when you want a cool kitchen and less hot water, a gas range is better. . . ." Simple, is it not? Yet when some of the people who read this were asked: "What effect has a gas range instead of a coal range on the temperature of the kitchen?" they replied: "A cool kitchen is used for a gas range." They ran their eyes over the page. They seemed to read. But what actually happened? Once again, a large group of persons *seemed* to read the celebrated stanza beginning

"The Assyrian came down like the wolf on the fold,
And his cohorts were gleaming in purple and gold"

and ending

"Where the blue wave rolls nightly on deep Galilee."

But when a suspicious-minded investigator tested them, quite a number turned out to suppose that the Assyrian's "cohorts" were an article of wearing apparel and that the last line referred to the astronomical discoveries of Galileo. Is this reading?

But you say, "I have never made such errors!" No? Then you are different from most people. A certain author attending a teachers' convention was surprised to hear himself quoted by

a distinguished speaker as favouring the use of a special procedure in a given set of circumstances. This was exactly the opposite of his published opinions, but he checked up to see if he could have blundered. No, the application under discussion stood condemned. Then he made discreet inquiries, and found that the eminent gentleman had blithely omitted to notice the little word "not" in a crucial sentence. Into these weaknesses we all relapse. If you doubt whether you can be a victim of such things, hunt up a good teacher of English who has been given up-to-date training and ask for a standardized reading test. You will probably be surprised.

Then, secondly, by saying that you may not be as good a reader as you ought to be, I mean that you almost certainly read far more slowly than you need. I have commented on this point elsewhere, and return to it here only as a reminder. There is reason to believe that most of us can speed up our normal reading very greatly. This would be tremendously helpful in many ways, would it not?

Thirdly, I mean that you may not be able to do certain special but extremely useful jobs of reading. You should be able to "skim" at about twice your normal reading rate *without losing too much of the sense*. Can you do it? You should be able to read in one way to pick out facts and in another way to pick out general ideas. How about this? Then there is another specialized job of reading—reading for the sake of summarizing, outlining, and taking notes. Investigations have proved that even very intelligent people are apt to fail in a test which requires them to indicate the precise subdivisions and sequences of the author's thought; and, if they cannot do this, how can they properly grasp his meaning?

The picture left in one's mind by the investigation of the present facts of reading is so doleful that I would not have brought it up save that we also know how it can be bettered. When people who are already above-average readers can increase their speed a hundred per cent. and their accuracy ninety per cent. in six weeks, there is certainly no need for pessimism. And the fact that they made these tremendous gains while carrying on the everyday business of life, and held

them with apparent permanence afterwards, gives us still more confidence.

How can such improvements be brought about? There is absolutely nothing recondite about it. There is nothing you cannot do for yourself, although of course a little personal guidance from an expert can help a great deal.

First of all, set apart perhaps half an hour each day to *practise purposive reading*. Select interesting material, material that will be worth reading for its own sake apart from any value it may have as an exercise. And then read it with a definite and concentrated purpose. What are some of the purposes to set up? Here are some. Say to yourself, "I'm going to read this stuff and spot all the statements of fact"; or "I'm going to follow every point of the argument"; or, "I'm going to enjoy and appreciate the handling of the language"; or, "I'm going to collate this with other material I've read on the same subject." It has been proved that what a person actually does under such differing self-instructions will be different. The whole reading complex changes with the job. The reason why you may get so little from a close-packed factual account is that you read it as though it were a novel. But if you read the novel as though it were the detailed account of fact, you would not enjoy it. *Efficiency in reading depends absolutely on purpose*. The chief reason why many people are poor readers is that they are purposeless readers. So practise purposive reading.

Does this sound too easy? Do you feel like the man in the Bible who came to the prophet to be cured of leprosy and then was mortally offended because he was told to do a very simple thing? That leads me to my second point.

Give yourself a weekly test. You will find it interesting and profitable. There are many good reading tests on the market which can be purchased cheaply. Buy a few of them. Often they are made up in two or more forms, called A, B, or C, so that you can use them on successive weeks and observe your progress. Administer them to yourself, or get a friend to help you. Or, if you like, use home-made tests. Have your friend construct a set of questions about a passage, asking every

imaginable thing, no matter how detailed. Tell him to cover every point, every idea, every statement of fact. Make the test accord with your purpose—if you read for facts, then have facts in it, if you read for ideas, then ideas, and so forth. In any case, use some means of registering results. Judging by the experience of many others, you are likely to find yourself making rapid and definite progress. You may be surprised to discover what concealed weaknesses you have, and equally surprised at how soon they yield to intelligent treatment.

Then use some of your practice time in *working for speed*. And do so directly. Of course, as you begin to read more efficiently you will also tend to read more quickly. But it has been found that direct and deliberate efforts to speed-up pay. Time yourself on reading paragraphs, and make word-counts when you have finished. Push for speed, but do not rush so fast that you begin to be slovenly and inefficient. Keep a record of your progress, and compare the scores week by week. Again, a large amount of experience indicates that you can expect improvement. Moreover, the improvement will be permanent. Even when you are not pushing yourself for speed, your normal, comfortable, unhurried rate will have become better. And do not think you have to toil long hours for such work to do you any good. Short definite bursts of speed practice are extremely effective.

Out of the research studies on reading comes a suggestion that can do much to improve both speed and efficiency. It is always well to get a general idea of the content of what you are to read before you read it. This immediately sets up an intelligent purpose, and shows you what to omit and what to pick out. If the author summarizes his chapter or states his conclusions, read this first of all. If there is a good table of contents which outlines the material, read it by all means. If you have noticed a review of what you propose to read, go over it. If a friend can tell you something about it, let him do so. This of course does not apply to purely recreational reading, such as detective stories. But it applies to all reading where one wants to gain a firm grasp of the contents in the least possible time. If you watch an expert going through stuff

in his special field, you will see that he rarely begins at the beginning and follows along to the end. He leaps about here and there. He is looking for the essential points and the main conclusions, and he hangs everything else upon them. Not only does he read his material much faster than the straight-line plodder; he knows more about it when he has finished.

All good reading is the assimilation of the printed page with a purpose. Not only is it contrary to fact to suppose that one sees everything on a page; it is impossible that one should. If one specializes on facts, one may miss generalizations. If one includes both facts and generalizations, one's sense of literary quality is likely to evaporate. Reading is always a specialized job. And it is this specialized job, leading both to speed and to efficiency, that you must learn.

III

The key to all good writing is having something to say and knowing clearly what it is. There are four very imperative "don'ts" for any person who wishes to improve himself as a writer. *Don't* make a formal study of grammar. There is very little relationship between the amount of grammar a person knows and how well he can express himself in English. If a point of grammar really troubles you, look it up when and as you need it. *Don't* bother much about the rules of so-called "good literary usage." They are merely rules of etiquette. Clear and forceful expression may be excellent as a factor for organizing and communicating essential ideas, and yet violate many of these small politenesses. *Don't* think that good writing is flowery writing. The quality of good writing is that it embodies and conveys ideas adequately and unambiguously. If the ideas are complex and subtle, the writing may be hard to follow, and still it may be good. If it is bombastic and uses long and elegant words where short and plain ones would do, it is sure to be bad. *Don't* try to copy the style of great authors. Under very skilled instruction this may be helpful, because a highly expert teacher will be able to show you why the great writer does what he does. Ordinarily what happens is that the

learner copies the author's worst and most obvious mannerisms.

If you want to improve your writing you must have practice. Where can you get it? *The best practice material is the stuff you write as part of the business of your everyday life.* Take, for example, a letter to a friend or to a business associate. You can teach yourself far more about the inwardness of the art of writing from such a letter than by cooking up a fancy description or an essay or a poem just for the sake of using English. The reason is that in the letter you have *something you want to say*. Good writing consists in being absolutely clear about what that something is, and then saying it clearly and without lost motion. You cannot hope to acquire it by just stringing words together without any particular aim in view.

Let us follow the process of learning a little into its ramifications. Choose a letter which need not be finished and posted for about a week. It should not be too short, but need not be very long. Consider carefully what you want to say before you allow yourself to put pen to paper. The trouble with much writing is that it is extemporized; that is, the author does not know what he wishes to convey until he is in the thick and heat of conveying it. When your ideas seem to be reasonably clear, begin the writing. Do not hurry, but do not stop to make endless changes and corrections. Produce a complete draft before you stop. Then read it over. Read it more than once. Read it aloud and *expressively*. Look first of all for any passages or expressions that are not perfectly clear. If you fail to find them, the chances are that you have not looked properly. A certain phrase has a double meaning; or it almost says what you have in mind, but not quite. Perhaps it needs expanding; perhaps a word must be changed; perhaps the order of words must be altered. In any case do not be satisfied until what you have on the paper conveys with entire precision just what you have in your mind; revise your draft until the approximation is improved; put it away in your desk and expect to continue revising until approximation changes to fulfilment.

Then consider clumsiness of expression. The most common kind of clumsiness is where a person says in many words what

could be said in few, or says in long, cumbrous words what could be said in short ones. It may be a symptom of clumsy and uncertain thought, and as you polish up your language you may also be polishing up your ideas. Consider too whether you have used trite and hackneyed and needless phrases. Some of the phrases common in much business correspondence are like colours smeared over the surface of the thought. Try to be brief and clear without being standardized. And look out for repetitions of words and phrases, or sequences of sentences all starting the same way.

Work for elegance, which is something quite different from floweriness, and means the perfect adaptation of the form to what must be conveyed. Have you written down any awkward-sounding combinations? Have you led your reader well from one sentence or paragraph to the next? Does each paragraph centre around a single main idea? Does it rise to a strong and effective culmination?

Revise your letter again and again until it is as perfect as you can make it. There are some people who say that they write their best on the first try and cannot revise. I believe that they are always wrong, and that their claim is simply evidence that they have never really analysed their own work. *If you cannot see anything wrong with a first draft there is something wrong with you.* Only a very disciplined and experienced writer can turn out high-grade work on the first try; and even he will not achieve his best. *The very essence of learning to write is taking the pains—and they are no small pains—to write one's best.*

If you will follow the suggestion I have made you will learn many things about writing. If you persist—and it takes persistence—you will come to write well. You will have shaped a pliable and effective tool that can serve you most admirably. Such practice, carried on for months and years, is worth more than a host of rules. But there are three more detailed suggestions which I believe it will be helpful to give you in advance.

1. Deliberately try to vary your connectives. In crude writing we often find strings of sentences hooked together with eternal "ands" and "buts." This has a very monotonous

effect. And, what is much worse, it shows that the writer either has not thought down into the delicate and subtle relationship between one idea and the next, or has not troubled to put it on paper. So concentrate on the connecting links between your sentences. You will find this an extremely fruitful rule. Ask yourself if you have caught and expressed the exact dependence of one sentence upon the next, and whether you have put it on paper freshly and tersely. This careful study of connectives is a valuable means of improving your power to write.

2. Pay minute and drastically critical attention to the structure of your sentences. Never mind whether or not you can analyse or "diagram" them, or know the names of their various parts. Be sure first that they are genuine sentences, genuine and complete statements with transitive verbs. And then see that each member of each one of them is shaped and fitted in like the stones of a jewel. Try your sentences over both silently and aloud. See if you can reconstruct each one of them to better advantage. Come back to them again and again after the draft has stood for a while and the fumes have cleared from your mind.

3. Make a definite effort to increase your vocabulary. Almost all of us know far more words than we use. Try to increase the number of words you know, and also the number of words you use. But do not carry on this endeavour by a formal, drill-like process. Some people make it a point to learn from the dictionary two or five or ten new words each day. It has been shown that even such a mechanical procedure will increase one's use-vocabulary over a period of time. But I think there is a better way. As you revise and remould your draft, see if some synonym of a word you have written down would not be an improvement. Roget's *Thesaurus of English Words and Phrases*, a book which gives enormous numbers of synonyms very usefully classified, may serve you better for this than a dictionary. But however you work, see to it that you become "vocabulary conscious." This increases the range of words with which you can think, and adds to your resources for accurate, forceful, and elegant communication.

All this advice on learning to write can be summed up very simply. Have something about which you want to write. Have someone to whom you want to write. Then take the utmost pains to write as well as you possibly can.

IV

The essence of a good speech consists in having something to say and then saying it clearly, directly, and forcefully. On the one hand, flowery language does not make effective eloquence. On the other hand, halting, disjointed, rambling, and pointless utterance comes far more commonly from having nothing to say than from not knowing how to say it. What is sometimes called the technique of a speaker is greatly overrated. One hears of men who rehearse gestures, study voice placement, and take lessons in elocution with the idea of gaining ability before an audience. And one cannot help thinking that they turn what is essentially a simple problem into a complicated one. You have a message to deliver, a point to make; and there is a group of human beings very much like yourself to whom you wish to utter it. What could be more normal than such a situation? If you can throw yourself into it naturally and enthusiastically, if you can stop thinking that you are about to attempt the pretentious job of delivering an oration and remember that you are only going to tell some people about something, the chances are that you will succeed. Be natural. Be conversational. Be direct. Learning to be a good speaker is simply learning to be as much yourself in talking to a thousand people as you would be when talking to one.

~ But there are certain elements of the situation which work strongly against this naturalness and directness. Your speech is *an occasion*. The chairman will call upon you. You will rise and face the crowd. Silence will fall. Everyone will be looking at you, waiting to hear your words of wisdom. You have been given twenty minutes, and in that short time you must succeed or fail. You must make a good impression or appear like a fool. You must get your message across or

jumble it. Is not this enough to paralyse your thoughts and freeze the words upon your lips? Is it not impossible to be direct and conversational in circumstances so constraining? How can you overcome both them and yourself? How can you learn to speak well?

The essence of learning to speak well is in learning to prepare properly. And, just as I gave you four "don'ts" in connection with learning to write, so I will give you one in this connection. *Don't try to prepare the exact words of your speech.* Even for the orator of genius this is a handicap. Bourdaloue, one of the great French preachers of the time of Louis XIV, always delivered his sermons with his eyes closed. Asked why this was, he replied, "Lest I should forget." The effort of remembering was so great that the memorized words came between him and his audience, instead of uniting them. And if this is a weakness in the greatest, it is a fatal defect in the ordinary man. Make a practice of learning your speech off by heart, and you are in the straight pathway towards converting yourself into a human gramophone instead of an effective speaker.

Do you say "But I can't think of good words if I have to make them up on the spur of the moment"? I doubt this, and in a moment I shall show you a method which can overcome any such difficulty as may exist. But in any case it matters far less than you think. *The detail of English is not very important in speaking.* Several times I have heard men deliver speeches which stirred and thrilled their audiences and which everyone, including myself, thought very eloquent and excellently expressed. Then I have had occasion to edit their remarks for publication from the verbatim shorthand record. And it was almost illiterate! Spoken and written English are two very different things. Sincerity, directness, and above all having something to say, can largely obscure all sorts of verbal crudities. The best way to take care of the detailed style of spoken utterance is to stop caring about it.

But care a great deal about the general outline and sequence of your speech. Take plenty of time in advance and prepare this with all possible thoroughness. Be quite clear as to your

central thought, the crucial point you wish to convey. One old hand at speaking says that if he cannot boil down the point of his address to a single short and pithy sentence he knows that something is wrong and that it is not yet ready. Write down this central thought, and refine your statement of it on paper with all the thoroughness I recommended in the preceding section. Then build your speech about it. Don't have a long and rambling introduction. Don't meander towards your main point, or at least towards its vital approaches. Get down to brass tacks as quickly as you can. Rely on substance and on the evidence of a real message to grip your hearers. Then lay out your main sub-divisions in some well-planned sequence. And under each subdivision prepare exactly what you mean to say. Make it as short as you can. Consider what is essential and let everything else go. Hit the nail on the head, by all means ; but don't give it a large number of little taps—one stout blow will be more effective. Say as much as you need to be clear and to introduce essential qualifications, but say no more than you need. Plan your conclusion with particular care. Know exactly how you mean to end. Many a good speech has been ruined by the inability of the speaker to finish.

Work the whole sequence into your head. Perhaps you may find it valuable to deliver it in solitude once or twice. In any case, sit down by yourself and think it through. Don't confine yourself to the exact words you plan to use. Think it through discursively, but always try to dig out and hold firmly to the central sequence of the thought. Let it be a flow of ideas rather than a flow of standardized language. If a happy turn of expression occurs to you, don't try to learn it off by heart. The only parts of a speech which it is justifiable to learn by heart in advance are the first few sentences and the last few.

You come before your audience *loaded*. You have something to say. Your work on it has probably made you want to say it. And you have a full ordering of the sequences needed to make it clear. Perhaps you should have a few notes to help you. Indeed, I think you should. For instance, if somewhere near the opening you say you are going to make

three points, it is just possible that, when you have finished with the first two, the last will have escaped you for a moment. A brief jotting on a piece of paper will save you from this embarrassment. But do not permit yourself extensive notes. It is always tempting to have reams of written stuff before one ; but it is bad for effective speaking, and not really necessary if you have prepared adequately.

You have decided definitely upon the very words of your first few sentences. As these proceed from your mouth, the pattern you have built up begins to run. You may use some of the words you have considered beforehand ; but again you may not. Words will not be lacking if the thought content is clearly grasped. Indeed, the very heat of the occasion may stimulate you to verbal flights which will astonish you even as you make them ! While you are speaking, treat your audience as human beings rather than as a great formidable *something* stretching dimly in front of you. Address yourself to individuals. Pick out someone who is particularly responsive, sitting well towards the rear, and speak to him at least part of the time. There are speakers who literally never see their audience as people from start to finish. Some of them are excellent, but they would be better still if they would school themselves to a more human relationship.

Many books have been written and many courses given dealing with public speaking. They have much of value to tell you—much upon which I cannot even touch here. But, like so many learning problems, this one also is far simpler in essence than we commonly suppose. Direct the will to learn along the lines I have indicated. Go ahead and make speeches. You will find out the details of the game in the manner most natural to you. To acquire effectiveness in spoken language is like acquiring effectiveness in anything else. We narrow ourselves down to the essential aim and concentrate on that. Coming to the essence through extraneous detail is always wrong, though in much teaching it is persistently attempted. Acquiring the detailed skills as one grows in one's grasp of the essence is always the proper mode for the direction of learning.

CHAPTER THIRTEEN
BOGIES, OBSTACLES, LIMITATIONS,
POSSIBILITIES

I

I CAN never hope to achieve effectiveness along some line, because I was born without the necessary special ability. I can never hope to be a good executive, because by nature I lack executive capacity. I cannot be a salesman, because salesmanship is not in me. It is no use my studying music, because I have no musical talent. To become a skilled mechanic is for ever beyond me because I am destitute of mechanical aptitude. I shall never amount to anything as a physician or a lawyer, because I haven't the proper temperament. I can never get anywhere with tennis or golf or mathematics or speaking, because I simply don't have the bump.

Have you ever heard such things said? Have you ever said them about yourself? Have you ever believed them? Or half believed them? Are they true or false? Are they real obstacles or insubstantial bogies?

If they are true, we had better know it. They impose very great and serious limitations upon us. In certain directions we are beaten before we start. And if so we had better not start at all. No one wants to waste his time—we have not unlimited time to waste. No one wants to bring down upon his head a peck of needless troubles—we have troubles enough without hunting more. This is a very serious question. Certainly it is not one to be passed off with a hearty laugh and an energetic “pep talk.” It strikes right down to the root principles for the wise planning of your life. Very properly, you demand to know the facts. And I take most seriously the responsibility of trying to tell you what they are as frankly and correctly as I am able. It is my own firm belief that these notions are fictitious, that they should be disregarded, that they are bogies rather than real obstacles.

However, let us begin by leaning as far as we can the other way. Let us bring together the facts that seem to indicate that people do indeed possess by nature special abilities and disabilities which determine what vocations and avocations and pursuits and modes of life they can and cannot follow.

First and most obviously of all we have the case of the man of first-class genius, and particularly of first-class artistic genius. When we have Mozart composing elaborate music at the age of four and performing respectably on the organ the first time he ever sat down at one ; when we have Handel playing the spinet on the sly in spite of all his parents could do ; when we have Giotto making pictures when he was supposed to be tending sheep ; then indeed we seem to be dealing with an irresistible gift of nature. And the argument can be put still more strongly. Could Shakespeare have been a great musician ? Could Beethoven have been a great painter ? Could Michelangelo have been a great dramatist ? It seems hard to say " yes " to such questions.

But just what does this prove ? Not nearly so much as it seems, or so I believe. Consider this. The great artist is an extremely unusual person. Eminent men in other fields may be equally great, but they seem to differ from him in one respect that for us is most important. They do not seem nearly so specialized. It would seem silly to talk about a Beethoven of finance. But we often call men Napoleons of finance. One can easily imagine that if Ford or Rockefeller or Morgan had lived in by-gone ages they might have been great statesmen, or great princes of the Church, or even great scholars. Or if they had been differently brought up, and had lived in Europe, we can without too much difficulty see them as great generals. The highly specialized great man is by no means the only kind of great man. Indeed, he is the exceptional kind. And one must not argue too widely from exceptional cases.

And even the artistic genius is not nearly so specialized as he seems. Careful biographical studies have shown that most of them have been very versatile. Quite often they did not know for a time which of the arts they would most like to follow. Nor have they always been very precocious. Michel-

angelo and Beethoven and Brahms and Van Gogh were not precocious at all in the ordinary sense. Their ultimate triumphs were most certainly the result of long and difficult learning. They were not men of one talent only, but often of many. But the span of life is too short for first-rate achievement along many lines. They shone in one field of endeavour, truly. But who shall say how much of this specialization was due to the pressure of circumstance and even to sheer luck, forcing them more and more inevitably along a certain line as success accumulated, rather than to some unique inborn gift? We simply do not know what it takes to make a great genius. And from ignorance no stable conclusions can be drawn.

But, after all, we are not dealing with the genius. We are dealing with people like ourselves, with the ordinary human being, so let us consider his case. Is the ordinary man born with an array of special talents and disabilities which nothing can overcome, or is he not? If this is not certainly true even of genius, it seems much less likely here. But let us be patient and examine the evidence.

If the ordinary person were born with a definite array of special talents, one surely ought to be able to find it out. Most elaborate, persistent, and ingenious attempts to do so have been going on for at least fifty years. The practical value, even the cash value, of such knowledge would be enormous. We should be able to tell in advance just what activities to recommend for a person and what to warn him against. And so the research has had as strong a motive as any that has ever been carried on. But it has continually drawn blank. First came the phrenologists, who thought you could read off a person's abilities by feeling the shape of his skull; but that myth is utterly exploded. Then came the characterologists, who said you can tell all about a person from the shape of his jaw and face, the texture of his skin, and the way his hair grows out of his scalp; but every reputable psychologist knows that this is rubbish. Then there are the graphologists, who think you can read character from handwriting; but it has been shown that no two graphologists are likely to agree on a reading, and that if a man's character traits are rated by ten of his most intimate friends,

they have absolutely no relation to what these fake scientists say they ought to be. And last, and by far the most important of all, came the mental testing movement, which really has scientific competence and conscience.

And just what has the testing movement proved? It has proved that human beings differ in *general ability*. One man is cleverer than another. This much we know; and we can even tell how much cleverer he is and at least some of the things we ought to do about it. But the testing movement has not even proved to what extent these differences in cleverness are caused by inherited nature, how much they are inborn. Ten years ago the experts were far more confident on this point than they are to-day. The more facts we assemble the more our doubts accumulate. And emphatically the testing movement has not shown whether people are born with different special abilities, and if so what these abilities are. It has tried to hard enough, goodness knows. Innumerable tests supposed to get at special talent have been heaped up. Innumerable claims have been pressed. Much noise has been made. But, when one subjects these tests to a rigid analysis, most of them turn out to be so much waste paper. They simply do not prove the point. One cannot discriminate special inborn abilities in human beings. Of course, some sudden epoch-making discovery might possibly come along and change the situation. But after so much effort, so many searches, and so many thousands of hours of time expended, the probability grows smaller year by year. Psychology has made out a case for general ability, but not for special talent.

I know very well that if you watch children it is very hard not to believe that some of them have inherited special aptitudes. They seem to develop some kind of definite bent so soon, and to grow up with a whole prepared set of likes and dislikes, talents and weaknesses. But the moment we try to isolate these factors and test them on a rigid basis, they escape us. Does not this seem very queer? Does it not at least suggest that they may be due to learning processes started by influences so subtle that they escape our notice—liking or disliking for a teacher, the influence of a companion, even a chance remark

overheard? We know that such influences have altered the entire course of many a life before to-day.

Where does all this leave us? I would sum it up by saying *general ability and levels of general ability are proved; purely inherited character of these levels is open to question; special inherited abilities are unproved and unlikely to be proved.* Practically this means that while of two men one may be able to learn faster and better than another and to go farther, both of them can learn, and to a considerable degree both of them can learn the same things. We cannot all rival Einstein, but all of us above the level of the moron can learn some mathematics. We cannot all be great painters or writers or musicians or executives or salesmen, but we can all go some distance along any of these lines, and very many of us can achieve at least a modest success if we handle ourselves properly. *The striking thing about human beings is not the restriction of the range of their possible learnings, but its breadth and variety.*

I would not be honest with you if I did not say that some people would not agree with the position I have taken. I am afraid that in not a few cases such disagreement comes from vested interests. There are individuals and institutions eager to sell certain kinds of tests, or at a lower and baser level to promote fake schemes which are supposed to analyse special talents. And naturally they do not like anything that interferes with their market. Then there are others who have taken courses in psychology in which they studied text-books based on evidence twenty years old. Their opposition is honest, but ill-informed. And also there are some who know the facts but who read a different story from them. For them I have nothing but respect, although I differ from their conclusions. All I can say is that this summary is my best opinion, derived from a painstaking endeavour to grasp the situation in all its angles. I am willing to give chapter and verse and full documentation for every statement I have made. And the net result, cast in terms of advice, comes to this: *You can confidently believe in the power and possibility of learning.* And when you consider that most people use only a fraction of their general ability for productive and serviceable ends, you see at

once that learning is worth while. *Mental streamlining is possible.* We are not born with streamlined minds, but with such and such a supply of energy. *Mental streamlining pays.* We cannot increase our power. We can increase our efficiency.

II

I cannot learn, because I am too old. I shall always be a dud at golf, because I was thirty-five when I took up the game. I wish I could play the piano, but I didn't study it when I was a child and my hand was still flexible. No one can master a foreign language if he starts when he is over twenty, so it is useless for me to try. A new job at forty? Impossible! I couldn't tackle it. I have never flown an aeroplane, and now it is too late. Become a writer? One has to begin young for that.

Remarks of this kind are often made. They are all variants on one theme: "You can't teach an old dog new tricks." They stop learning before it starts, because they block off the essential condition. They paralyse the will to learn. Only a feeble and wistful wish remains, soon to be relegated to the scrap-heap of the might-have-been. What about it? Are these notions true or false? Are we dealing with bogies or with real obstacles?

Do most people of middle age believe that they cannot learn? Is this the real consensus of opinion? Perhaps you are inclined to answer in the affirmative. But how many such people have you questioned on the point, and how thorough was your questioning? It may very likely be that you have heard not more than ten or a dozen middle-aged persons express such views. And perhaps they were giving vent to snap judgments which they would change materially on more careful consideration. Ill-considered opinions from a few individuals cannot have the weight of a majority vote.

Now, of course, a majority vote on such a matter is almost impossible to obtain. However, psychologists have obtained a good sample of carefully considered opinions from a con-

siderable number of individuals. Ninety-nine questionnaire returns from men and women of later middle age were assembled in which they expressed themselves on 163 points relating to their ability to learn and their beliefs about it. Their views are of the greatest interest. They held that almost anything can be learned at least up to the age of fifty ; that some kinds of learning are harder after forty ; that where mental skills and abilities are concerned they are not any harder to learn during middle age than during childhood and adolescence ; and that much of the difficulty experienced by an older person may be due to his being more sensitive to ridicule and fonder of his dignity than when he was young.

So far as opinions and beliefs go, these results cannot be called conclusive, but they are highly indicative. If a thousand responses to the questionnaire had been obtained, the picture would probably have been about the same, although we cannot, of course, be entirely sure of this. Clearly older people do *not* disbelieve in their ability to learn when the matter is put to them carefully. But are they right? The facts seem to indicate that they are.

Mature men and women in evening courses in schools and universities do approximately as well as younger people. Moreover, they do approximately as well in shorthand and typewriting, and not only in conventional academic studies. If we turn to specific pieces of research investigation, the conclusion is still further confirmed. The differences between older and younger persons in respect of learning ability are small when compared with the differences between individuals irrespective of age. But these latter differences are due to the *general ability* about which I spoke in the preceding section. A stupid old person will not learn as well as a bright young one ; and a stupid young person will not learn as well as an able old one. If we disregard everything but the difference in age, ability to learn seems to be about the same. Moreover, the old person can learn the same kind of things as the youngster with only a few exceptions. He can learn to type-write or to do shorthand or to write with his left hand or to

solve mathematical problems or to read and write a foreign language, or to dance, or to swim. Whether he can learn to speak a foreign language with a perfect accent is not known ; but neither is it known how well the youngster can do this. The older person is not likely to do so well with new physical skills, but part of the reason for this may well be that he has not kept himself in good physical condition. All these statements are very far from guesses. They are not even based on the general experience of persons who have taught adults or of the adults who have learned. They are derived from carefully controlled research, and may be considered as valid as any such conclusions can be.

Moreover, we know that in the higher level "blackcoat" pursuits men do not commonly approach their maximum efficiency much before the age of forty. And people of outstanding ability tend to produce their very best work somewhere in the neighbourhood of fifty. These conclusions again are based upon carefully compiled and statistically analysed evidence.

Are we not then almost bound to say that the age-limit idea is a bogey rather than a real obstacle? Learning capacity seems to increase very rapidly during one's earlier years. A person can learn most things better when he is ten than he could at five, better at fifteen than he could at ten, better at twenty than he could at fifteen. The limit of such improvement due to nothing but growing up has been set at twenty-two. But after that the decline is very slow. Twenty-five years later the capacity to learn does not seem to have been greatly impaired, although the curve has fallen somewhat. But the average man of forty-five can learn most things approximately as well as he could in his late 'teens.

The real obstacles to learning at comparatively advanced ages are not physical for the most part. They are not inevitable. They can be overcome if one wants to do so. The older person usually has less time to learn new things than the child. And he has far more skills, abilities, and interests already acquired that must be kept up. He is less willing to try ; more sensitive about looking foolish. And certain abilities and

interests that he has built up may tend to block the acquisition of new ones.

When he thinks back to his childhood he is apt to forget much of the unpleasantness and trouble he experienced. He thinks his youth was happier and more care-free than it really was. This is a very general tendency of human nature, and it affects our notions about our youthful learning. We forget how hard it was for us to learn things when we were young, and do not realize that it need be no harder when we are middle-aged. We make all sorts of excuses for not learning. We say that our hands or our vocal organs have ceased to be flexible; but it has never been proved that the softness and pliability of the child's body really help learning. We say that it would be ridiculous for us to take up dancing or painting or writing or salesmanship at forty. *It might be ridiculous, but it is far from impossible.* If you say, "But I can never do very well with anything started so late," I may reply, "The reason is that you have less time to give to it than you once had." And then I might go on to insist that if your learning is expertly directed many of the effects of lack of time can be overcome.

When one reasons out the case with care, and assembles all the evidence, and winnows it out from the fixed opinions of persons who "know" that this and that is so without being in the least able to prove it, age up to fifty does not seem a serious impediment to learning. Moreover, there is a factor of great importance which may well offset any drop in efficiency due to the passing years. One can become more teachable; one can discover many secrets of self-direction; one can handle oneself to greater advantage; in fact one can learn to learn.

There are plenty of people who never do this; but I am convinced that it is feasible. So do not allow advancing years to daunt you if you wish to acquire new skills, new interests, new attitudes, new powers. You may know that these things can be done because they have been done. It all depends upon one thing—the preservation down the years of a lively mind, of an attacking spirit, of a will to learn which grows more confident and effective through the repeated experience of success.

III

I cannot use my mind for very long at a stretch because it becomes fatigued. I have so many things to do that I simply cannot undertake to learn a new skill. When I get home from my job I can only relax and rest. What is the use of talking about the will to learn when I am so tired that I can't learn at all?

Once again we are in the presence of ideas which tend to limit a person's willingness to learn. And once again we want to know whether they are real obstacles or only bogies. Let us have a look at the facts.

One cannot say that the results of research on mental fatigue are as clear, complete, and certain as one could wish. But a point of major importance stands out conspicuously. *Fatigue of the mind is quite a different affair from fatigue of the body.* When a certain muscle is used again and again it gradually poisons itself with its own waste products. Little by little it loses efficiency. At last it refuses to respond to the impulses telegraphed to it by the nerves, and will not move at all. Then it must be rested until the poisonous substances are washed away by the blood-stream. But the mind does not seem to show any such creeping paralysis of its powers.

In the extensive experiments dealing with the question it was felt to be very important to choose tasks that would be entirely mental—tasks, that is to say, which involved just as little bodily action of any kind as possible. Even focusing one's eyes on a page of print or writing with a pen might introduce a disturbing factor, because eyes or hand might tire without the mind becoming tired. So one of the favourite jobs which the investigators have set up has been doing mental arithmetic. Then the only physical activity needed is to write down or call out the answer.

Now, a task of this kind can be continued for four hours at a stretch without any noticeable drop in efficiency. And in one classic study very much more stringent requirements were set up. The experimental subject was a person who could do mental multiplication with four-place numbers—for instance,

she could multiply in her head 4793 by 3819—a task which is simply beyond most of us even at our freshest and best. And she carried on this tremendous task, demanding the utmost concentration, for twelve hours a day, and went on day after day. At the very end of the work there was some slowing down, but not a great deal. And, as the investigator pointed out, it is so remarkable to be able to do mental four-place multiplications at all that a little slowing down hardly counts. So mental fatigue did not seem of much importance.

Moreover, it has been shown that the *feeling* of inability to go on working is not very closely related to *genuine* inability. One feels that one simply must stop, that further effort is impossible, that one cannot do another tap. But if one still pushes oneself, and submits to careful tests, there may be no marked drop in the speed or accuracy of one's output.

"But," you say, "am I being asked to believe that there is no such thing as mental fatigue? Surely that's a bit extreme! In spite of all the research studies in the world, I know there is. I've experienced it many a time."

You are quite right in your protest. I am not trying to suggest that, as we continue with a job of mental work, we do not gradually build up a feeling and a condition that is very disagreeable, very threatening to effectiveness. Of course we do. The existence of such a feeling is not in question. The question is its interpretation, its true nature.

The feeling that we call mental fatigue seems to come from two sources. The first is boredom: as the job goes on and on our interest in it wanes. Increasingly we wish to go out to a cinema or play a game or read a novel. And quite obviously this is enough to cut down efficiency. If we could really overcome such boredom, if we could maintain interest, then at least half the fatigue problem would be solved.

And the second half would be solved if we could cancel all physical straining in performing mental tasks. For the other source of the feeling of intellectual fatigue is bodily. Our eyes grow tired, our hands grow tired, our backs grow tired, and we want to stop. In carrying on mental work it is hard to avoid considerable constraint of posture. We sit hunched over

desks or crouched before typewriters ; we peer into microscopes or bend over laboratory benches. And all constrained postures held for a long time become extremely fatiguing. We want to change our position, and this broadens out into wanting to change our occupation.

If we could use our minds on matters of continuing interest in a state of effortless comfort it is doubtful whether we should ever feel fatigue or whether efficiency would drop from the beginning of the day to its close. And the way to deal practically with the fatigue problem is to approach such conditions as closely as we can. The physical surroundings of mental work are always very important. One should have enough light, coming from the proper direction. One should be particular about the height of one's desk and one's chair. Often a desk or table whose height can be adjusted is found serviceable, for then one can stand up to work for short periods of time. The condition of the air—its temperature, its humidity, and the amount of carbon dioxide it contains—is an important point. In a word, mental work goes best and can be continued longest when physical effort of every kind is reduced to a minimum, when bodily relaxation is favoured, and when organic strains and particularly postural strains are avoided.

Besides the physical conditions of mental work, its setting in one's scheme of interests is a paramount consideration. Everything that I have been saying about the learning process applies here. Efficiently directed learning, with the will to learn aroused and organized, tends strongly against fatigue. One learns to resist fatigue, one learns to work even when one feels weary, *by acquiring and strengthening interests.*

One does not become mentally fatigued by merely using one's mind. A muscle grows atrophied if it is forced to contract again and again. But a mind can work on and on. One grows mentally fatigued because certain resistances, certain pulls against the operation one is conducting, are permitted, and because these become continually stronger and more formidable with the passage of time. Eliminate them and you eliminate fatigue. The streamlined mind not only works

faster and does more with the same amount of power : it can continue working far longer.

IV

I cannot learn, because I have no teacher. How often we hear variants and broken echoes of this complaint ! Is it legitimate or illegitimate, true or false ? Is the absence of a teacher a very serious obstacle, or only a bogey with which we scare and discourage ourselves ?

It may very well be that a person who complains that he cannot learn something because he has no teacher is giving himself hopelessly away and revealing a lamentable weakness. Often such a person really means that he cannot trust himself, that he must have somebody to stand over him and to tell him to do thus and so by to-morrow and to bully him unless he does it. This is exactly what is often called "teaching" in our schools, and it sums up many people's ideas about it. But should we call it teaching ? I hardly think so. I would rather call it policing. And if you cannot learn without a policeman standing over you then certainly you are not likely to be much of a learner, or to achieve any great effectiveness, or to go far towards making your mind an efficient streamlined instrument. If that is what you mean when you say you cannot learn without a teacher you come very near to saying that you do not know how to learn at all.

Teaching, however, can and should signify something very different indeed. *The job of the good teacher is always to organize the learning processes and to render them more efficient.* That is how he earns his pay. That is what you buy when you engage him. Consider how the job is done and what it involves. First of all the teacher provides you with an incentive. He gives you something definite to work for, a lesson or a conference for which you will prepare. Then he saves your time and energy by showing you how to go to work. He tells you what books to read, what kind of practice to set up. He can show you how to do more in a given time, how to move faster, how to avoid blind alleys and dead ends. Afterwards he

criticizes the results of your endeavours and shows you quickly where and how you have gone wrong. If he knows his business he can diagnose your faults and difficulties more rapidly than you can by yourself. Then he can help you to vary your attack upon the problems with which you are dealing, a point the importance of which we have already considered. By his comments, his wider knowledge, and his riper skill, he can make your whole task more interesting, more significant than it might be if you worked on it alone. And lastly he can prevent you from being satisfied with a mediocre result. He can tell you that your story or your golf game or your musical performance is not as good as it might be and should be when you might be content with it if left to yourself.

There is no denying that the service of any teacher who can do such things is a great advantage. The teacher is an expert on learning just as the physician is an expert on your physical condition. He can give you very valuable aid. But still there is no reason to despair even if such a teacher is not immediately available to you.

First of all, if you understand how to learn you can teach yourself a great deal. Review once more the statement I have just made about the job of the teacher. Does it not come to this, that the teacher applies the very principles and ideas which I have been urging upon you all through this book? And why cannot you apply them for yourself? In some cases it will be harder than in others. External criticism is often more revealing than self-criticism. A good deal of time can be wasted in trying to find the best method of dealing with some kinds of problems. But if you are persistent, ingenious, and intelligent in handling yourself along the lines indicated by abundant psychological research, you can almost always accomplish a great deal.

Once again, the actual amount of teaching which you need may not be so very great. Do not think that you must have an instructor constantly at your elbow for months or years in order to do any good. A pregnant suggestion, a few hints, a revealing criticism, may be quite enough to set you on the right track or to re-direct you if you are going wrong. You

can go far on one or two lessons if you are alert to learn. The notion of learning as caused by repetition carries with it the notion of teaching as a police job of keeping the learner's nose to the grindstone. Both are fallacies. Learning depends on the organized will. Effective teaching helps the learner to organize his will. Just as I have constantly advised you to learn as much as you can from each experience, each repetition, so now I advise you *always to learn as much as you can from each lesson, from each contact, with an expert.*

Finally, remember that being taught does not necessarily mean "taking lessons." A book can teach you. So can the innocent comment of some friend or relative—even of some child—who knows far less about the subject than you do. Seek such contacts, such experiences, such criticisms and comments and suggestions. Make as much of them as you can. Even when they are ignorant and stupid and annoying you may think about them until they yield you something in the way of intelligent and stimulating self-direction. The good learner will be teachable. He will always be on the look-out for helpful suggestions. He it is who can get the most from a first-rate teacher. But he can be taught in many other ways than enrolling under such a teacher and taking a series of lessons. For the good learner everywhere and always, even when working with an expert and following all his instructions, proceeds by the intelligent organization of his own will to learn, and is in that central and necessary sense self-taught.

CHAPTER FOURTEEN

THE PSYCHOLOGIST SUMS UP

You will remember that our discussion opened with the psychologist looking at you as an average human being, and in the light of his knowledge and special viewpoint stating what one thing about you impressed him most. The essence of his

diagnosis was *needless ineffectiveness*, lost motion, failure to use fully the powers you possess, toleration of unnecessary and hampering resistances to successful conduct. We found him believing that the investigations which he and his colleagues have made, particularly of the learning process, can be of enormous value to you in the business of life. The work that has been done during the past fifty years has given him a great deal of very fruitful knowledge about how human beings can learn efficiently and economically. Whenever and wherever that knowledge has been applied remarkable results have followed. It has been found that persons of all ages can acquire mental and physical skills far more easily and rapidly, and carry them to a much higher level of competence, than ordinary experience would lead one to suppose. So the psychologist feels that the practical value of his knowledge is beyond reasonable dispute. Yet he is aware that it is largely confined to specialists. Whenever he happens to think about this he finds it astonishing, not to say preposterous. For an understanding of the learning process is not hard to attain. It is not, like higher mathematics, necessarily wrapped up in difficult technicalities which one must spend years to master. It is quite available. And also it is just what most people need to have. An immense amount of avoidable failure and of mediocre and dubious and half-way success comes from sheer lack of knowledge of the conditions of success; for obviously the art of learning is the art of coming to do what you need to do as well as you need to do it—that is to say, the art of success. The psychologist will not claim that by learning you can increase your native supply of ability and power. But he does insist that by its means you can use that ability and power far more effectively. This is a very great deal. By means of learning you can streamline your mind.

Such then was his contention. And we proceeded to make it good. We went on to see what he and his colleagues have to tell us about the learning process and its efficient direction. We found that it was an affair not of routine but of discovery, not of repetition but of will. The more closely we cling to this idea, and the more realistically we apply it, the more surely

we shall solve our problems, the more swiftly and completely we shall achieve effectiveness, and the more satisfactorily we shall overcome what seem like hopeless obstacles but are often mere bogies. And now, as we finish with detail and draw to a close, let us ask our friend how he would sum the matter up, and what broad lessons he would draw from all of it.

First, I think, he will warn us against premature and unduly easy self-satisfaction. As soon as we become satisfied, learning stops. We may repeat a performance endless times, but it grows no better. The same error, the same inefficiency, is repeated again and again. We may perhaps not learn the error by repeating it. But we continue to commit it. We do not grow out of it. It stays with us, *because we have ceased to care about it*.

But perhaps the case is not quite so obviously bad as this. Perhaps the trouble is more subtle. Perhaps instead of making definite errors, we are just performing at a relatively mediocre level. Here also the prime cause is likely to be premature satisfaction. The longer a man can remain steadily dissatisfied with his work—*steadily* dissatisfied, not transiently annoyed or disappointed—the longer he can improve and the farther he can go. When a man becomes content with himself he stops growing.

So the deliberate cultivation of self-dissatisfaction is a great factor in the art of success. This is why it is always dangerous to be the big frog in the small puddle. Cultivate the society of men more capable than yourself. In the secret places of your own mind, and without saying a word to anybody, appoint such men your unofficial teachers. Watch them. Study them. Compare their performance with your own. Analyse what they do, and try to see how they do it. Do not be ashamed to take the attitude of the learner. Emulate the example of the great Ignatius Loyola, who, in the years of his virile maturity, humbly joined a class of little children and learned to read and write. By such means you will *deserve* the success for which so many men only vaguely hope.

Then, secondly, our psychologist friend will warn us against *discouragement*. This is the other side of the medal, and quite

equally important. You can learn. You can improve. You can increase your efficiency. You can develop yourself. No one can say how far you may be able to go. But all the evidence we have collected proves that you can do better than you are now doing in almost every task, mental or physical, on which you are now engaged. If men who have been employed on a job for twenty years can make an almost immediate advance when given proper direction, and if world's records can be bettered again and again over periods of many years, you have pretty good warrant for believing in the possibility of improvement for yourself. It all depends on whether you really want to improve, whether you are really willing to try.

Do not cheat yourself with excuses. Do not say that you lack ability for such and such an accomplishment. Your claim has little psychological foundation in any case. And you cannot tell much about your abilities in advance of well-directed, purposive, experimental learning. Do not say that you are too old to tackle something new. This, as we have seen, is another favourite bogey which frightens those who lack the spirit of enterprise.

Do not give up trying too soon. I have said many times that our psychological knowledge enables us to learn with greatly increased ease and economy. But I do not wish to suggest that you can rise to your highest level of achievement without effort. If that effort is not well directed its outcomes are almost sure to disappoint you. If it is well directed its results are apt to be astonishingly fruitful. But, however well directed, effort is still essential, and often it must be continued for a long time. You wish to become an expert salesman, a fine executive, a good golfer, a competent writer. Remember always that you get there not by repetition, not by banging away with your head at the same spot on the stone wall, but by exploration. You must invent, you must discover, you must find the right technique. Now, many and many a man, confronted with such challenges, has made a few ill-chosen efforts, failed, and given up. Others perhaps have persisted for some time and have still been daunted and checked by failure. Progress has seemed to elude them. The new ability they have been seeking has refused to

emerge. It has not "clicked." But perhaps if they had gone just a little farther success would have arrived.

Such discouragement is often due to a false notion of how we learn. Learning is anything but a smooth advance. It often goes by very abrupt stages. For forty days nothing may happen, and then on the forty-first we find that for which we were seeking. The telegraphist struggles along with letters, letters, letters. He seems to make no progress at all. Then quite suddenly he is writing not letters but whole words! If he had given up on the fortieth day he would have believed all his life that telegraphy was impossible for him and would have regarded the expert as a being somehow different from himself. But on the forty-first day the clouds broke! Remember this whenever you are tempted to give up on a job of learning. Success may be "just round the corner."

The third point in the psychologist's summary will be the essential importance of *organization*. The will to learn must be intelligently organized, otherwise it is a mere ineffectual wish. You must take yourself in hand and put the job through. *Learning requires generalship.*

When you went to school your learning was more or less completely organized for you. You were given daily assignments, and these were checked up. You were told to read certain books on schedule. Tests and examinations were announced, and for them you were expected to prepare. And from time to time, perhaps, reviews were set up. Of course a good deal was left to you. Your teacher could not stand over you all the while and dictate every move you made. And, after all, why should he? Now, your success in school and the amount you got out of your studies almost certainly depended more than anything else on how well you organized yourself when you were let alone to do as you pleased. One of the most striking results of investigation on the work of students in school is that those who rank high spend on the average *less time in study than those who rank low*. This seems so contrary to what we might at first expect that if it had been demonstrated only once or twice we might be inclined to doubt it. But the contrary is true. It is a normal result, confirmed again and

again from many angles. Is it so paradoxical, however? Not on the basis of what I have been telling you in these pages.

Here is John Jones, scoring high marks. Tom Smith, who cannot for the life of him reach over fifty per cent, envies him. And Tom's envy rises almost to hatred when he suddenly finds that John is doing only half as much work in a week as he. How can this be so? Why should it happen? The answer is organization. John distributes his time wisely. He looks far ahead. He plans his whole term's work as a unit. He does not leave things to the last moment. If his teacher does not set up reviews, he undertakes them on his own account. He checks up on his own progress. He diagnoses his weak points and takes measures to correct them while there is yet time. He never appears rushed. He never sits up at night with a pot of coffee and a wet towel. And yet he gets through far more than the "swots" and does it far better. Perhaps John is just naturally brighter than Tom. But this is not necessarily so, and in any case it is far from the whole story, for John's brightness must be applied to the practical situation before him, or it cannot be much use. It must express itself in action. It must show in the way he handles and organizes himself. Here is his secret. Instead of envying him, Tom would be well advised to learn it. There is no patent on it.

Remember this. The only difference between yourself and John Jones and Tom Smith is that you have no teacher to tell you what to do. You must fight your own battle. You must be your own general. You must decide what you want to learn. You must distribute your time and energy in order to learn it. Can you do it? Of course you can. Take yourself in hand. Be a realist. Be intelligent. Plan your day so that you have a strategically chosen time for working at the ability you wish to acquire. Do not be fearfully inflexible about it. Do not set up an iron-bound schedule—this device suits comparatively few people—but transform your wish to learn into planned action. Plan your month, not trying to accomplish too much, but aiming always to accomplish something. Do not hurry. Do not be ashamed to loaf, for learning can sometimes take place while you loaf. Fit your activities to-

gether in a pattern which has reference to your will to learn. Plan your year, taking up the new abilities that seem desirable or the improvement of present abilities that seems advisable, at the most strategically feasible times and in the most strategically feasible order. Plan to learn things in those circumstances where they can be learned best.

Go even beyond this. Organize your whole life with respect to the will to learn. Intelligently organized learning, intelligently organized living—these are the secrets of making the most of yourself. This is the way to streamline your mind.

THE END

